

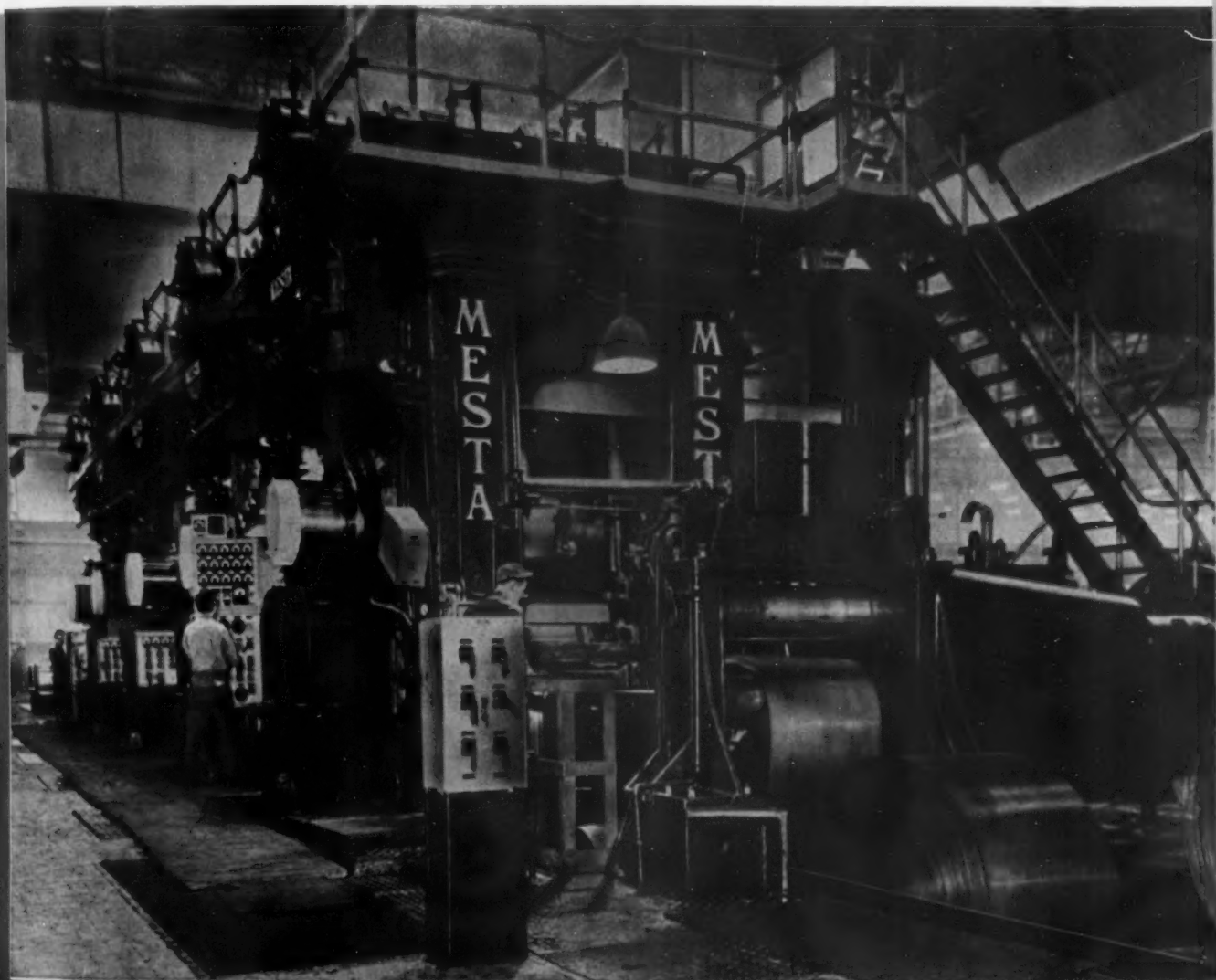
The **Iron Age**

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • NOVEMBER 4, 1954

New ideas
in
steelmaking
OF MICHIGAN
See page 113

EAST ENGINEERING
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Mesta 48" Four-High, Five Stand
High-Speed Tandem Cold Mill

Designed and Built by
MESTA

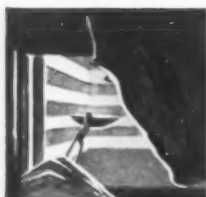
The World's **HIGHEST SPEED**
Cold Mill
**FOR FAIRLESS WORKS,
U. S. STEEL CORPORATION**

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY, PITTSBURGH, PENNSYLVANIA

How much heat from a "heat" of Chromel?

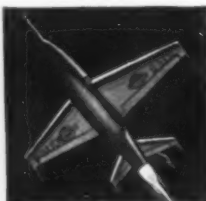
You've seen molten metal before . . . but chances are you've never seen a "heat" that's more closely controlled as to composition and quality than the one you see above. For this is a heat of Hoskins Chromel . . . the *original* nickel-chromium alloy that *first* made electrical heating practical. Into it go precise amounts of the purest raw materials obtainable . . . mixed, melted, and poured in exactly timed cycles.



Heating elements made of Hoskins Chromel give long life service in industrial electric furnaces, home appliances.



Spark plugs equipped with Hoskins electrode alloys give long dependable service wherever they're used.



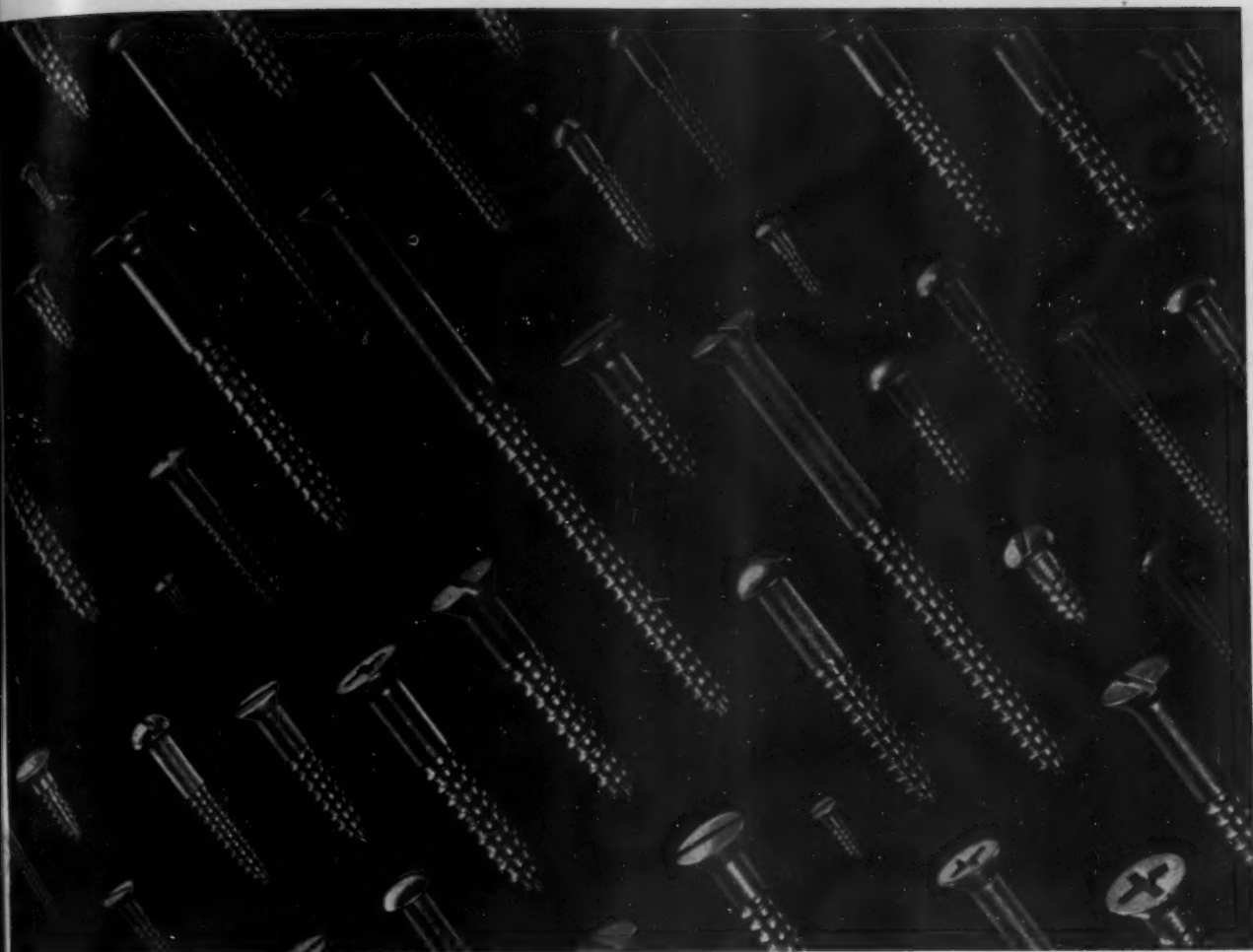
Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.

And from it, ultimately, will come approximately 1200 pounds of fine finished material . . . smooth, bright, durable wire or ribbon produced to a specified resistivity for long, dependable service as heating elements or cold resistors in countless different electrical devices.

Chromel, however, is only one of many specialized, quality-controlled alloys developed and produced by Hoskins. Others include: Alloy 502 . . . used throughout industry for a wide range of heat resistant mechanical applications. Spark plug electrode alloys . . . which have become universally accepted standards of quality and durability. Alloy 717 . . . used in facing engine valves for longer life and improved service. And, of course, there are Hoskins Chromel-Alumel thermocouple alloys for industrial furnaces and jet engines . . . unconditionally guaranteed to register true temperature-e.m.f. values within close specified limits.

HOSKINS
MANUFACTURING COMPANY
4445 LAWTON AVENUE • DETROIT 8, MICHIGAN





A billion wood screws sold every 49 days

That's right! In 1953 sales of wood screws in this country totalled nearly 7½ billion, according to the U.S. Wood Screw Service Bureau.

Many leading manufacturers of wood screws and other fasteners rely largely on Bethlehem wire of cold-heading quality, which we furnish them in several different analyses and heat-treatments, depending upon the size, type of head, and kind of screw.

Screw wire is just one of many specialties that we produce regularly in our modern wire mills. Each kind of Bethlehem wire has the right strength, ductility, finish, and other properties required to give best results for a particular application. Tire-bead wire, for example. And wire

for upholstery springs, for steel wool, brush handles, bicycle spokes and lock washers.

The steel wire that's best for your product is likely to be a grade and quality that we're producing right now. At your invitation we would be glad to have a Bethlehem man talk over your needs and give you full information.

Perhaps he could help you solve a wire problem right now. Just phone the nearest Bethlehem sales office, or drop a line to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation. *Export*
Distributor: Bethlehem Steel Export Corporation

Bethlehem **COLD-HEADING WIRE**



Starred items are digested at the right

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A Scrap Storm Is Brewing. 7

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NEWS DEVELOPMENTS

PENTAGON PICKS INDUSTRY TEAMMATES — P. 69

Teaming the technical knowledge of U. S. industry with the planning capabilities of the national defense strategists is the foremost job facing military logistics experts today. Defense planners are listing possible wartime suppliers, charting their basic materiel needs. Military agencies select the firms and allocate production targets. Another task is to project additional war capacity needs. But too often Pentagon-industry liaison is poor.

PROFESSORS LEARN FROM INDUSTRY VISITS — P. 71

Fellowships-in-Business program has allowed more than 500 college professors to study practical management problems of business, industry in summer sessions. Better understanding, righting of wrong impressions is the beneficial result.

HOW YOU CAN PLAN TO MEET ESTATE TAXES — P. 76

Minimizing estate taxes is not enough. It is vital that sufficient cash be available to pay taxes which are unavoidable. There are several sound methods of assuring enough liquid assets to help keep the business going for the benefit of your family.

SHOW NEW ACCIDENT PREVENTION METHODS — P. 79

Safety engineers overflow with ideas at National Safety Congress. Inland shows model crane for training new men. Algoma uses flashing lights on cranes. One foundry fires offenders after fourth warning. Tell how to deal with dangerous pop bottles.

UNEMPLOYMENT SHOWS SHARPEST DECLINE — P. 81

First week of October brought the sharpest drop in unemployment registered in the past 3 years. Total jobless was 2.7 million, 385,000 less than the first week of September. Breakdown shows industrial employment up 300,000, agricultural off by 300,000 seasonal workers. Net results indicate the economy is on an even keel with slight gains.

NEW AUTOS SPARKED PRODUCTION MIRACLES—P. 91

Pontiac's switch to V8 engines for 1955 took production sleight-of-hand. Old straight-eight and six production facilities were moved to temporary quarters and V8 tooling installed with only three days of stoppage in entire 2-year changeover operation.

ENGINEERING & PRODUCTION

STEEL PLANT FEATURES CONTINUOUS CASTING—P. 113
Some of the most modern equipment ever designed for steel production has been installed at Atlas Steels, Ltd. in Canada. Main feature is a commercial continuous casting machine for stainless and specialty steels. Other advanced equipment includes a planetary mill and continuous high-head heating furnace.

CONVEYOR SETUP REDUCES WORK IN PROCESS—P. 122
To avoid work pile-ups and keep part damage at a minimum, a carefully planned conveyor system was installed in one automatic percolator manufacturer's plant. All handling units mesh perfectly for smooth, trouble-free production. System uses almost every type of conveyor.

RESISTANCE HEATING SPEEDS METAL FORMING—P. 124
Resistance heating for forming metals that require close temperature control has many desirable features. Forming temperature is never exceeded and part is never removed from heat source. No time is needed to move the part and there is no heat loss between the heat source and pressure source.

ECONOMY IN FLAME-HARDENED LARGE PARTS—P. 126
Flame hardening is often preferable to other heat treatments on large iron and steel parts. Its economy is apparent where only certain part areas need a wear resistant surface. Through hardening would be unnecessary.

AUTOMATION UNIT DOES ALL FOUNDRY WORK—P. 128
Automatic foundry operation, from filling flasks to shakeout, has been made possible with an integrated automation unit. Designed to meet smaller foundry needs, the equipment combines a series of both usual and unusual handling devices.

COMPACT UNIT PLATES COATINGS ON STEEL WIRE
Heavy, ductile coatings of copper, nickel and other metals are now applied economically to steel wire with a plating unit which only occupies a 30 x 60-ft floor space. Compact design is made possible by spiralling the wire through the plating baths. Application of proper thickness of copper on steel cuts costs.

MARKETS & PRICES

STEEL EARNINGS DOWN IN THIRD QUARTER — P. 72
Steel industry net earnings in the third quarter were approximately 32 pct lower than third quarter '53. And the 9-month total for '54 is some 22 pct under the same period last year. Drop tied to ingot production declines of 28 pct in third quarter and 30 pct in 9-month total as compared to high output in 1953. Blame inventory cuts.

STEEL FABRICATORS FEELING RAZOR'S EDGE — P. 75
Steel fabricators will probably put more tonnage into place this year than in any year except 1929. It looks as if business will hold up well next year, too. But, despite the high volume of business, competition is razor sharp. Many complain that some jobs are being bid below realistic cost levels.

COLD-ROLLED SHEETS LEAD STEEL UPTURN — P. 167
Although other steel products carried the ball most of this year, cold-rolled sheets are leading the last quarter advance. Greatest market strength is in the Chicago-Detroit axis, where revived automotive demand has been piled on top of demand from other more consistent users. Some midwestern mills, sold out this year, are booking first quarter.

STEEL MARKET INCREASINGLY HEALTHY — P. 168
Galvanized, hot and cold-rolled sheets lead the onward and upward movement. Sheet demand is booming in some Midwest centers, good everywhere. Stainless, alloy and carbon bars show continued improvement.

DEFER MORE COPPER STOCKPILE SHIPMENTS—P. 174
Copper suppliers last week were authorized to defer shipments to the national stockpile for the rest of the year to ease the consumer pinch. Buyers will have about 25,000 tons more available as a result. Meanwhile, stockpilers have sent out their regular monthly requests for more lead and zinc.

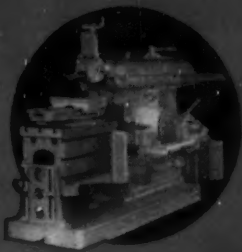
CANNING GROWS LARGER AS TINPLATE MARKET
Tinplate producers are wading happily into a sea of soda pop. They hope to be swimming in it soon. Pop appears to be the next volume product to keep tinplate producers setting new records. First tried in '50, it really clicked by '53. Fresh milk may be the next big booster. Research now being conducted.

NEXT WEEK:

90 pieces per hour

...on this CINCINNATI

SHAPER



Photograph courtesy Prindley Machinery Company, Chicago



Work piece is a malleable iron, Warnock diagonal block. Production, 90 per hour. Special designed gang tool holder carries six form ground high-speed tools.

This production job on a special Cincinnati Shaper is finished in one completely automatic cycle. Both initial cost and tooling costs are low.

The operator starts the Shaper; the head automatically feeds nine strokes to the right, nine to the left and stops. The operator indexes the fixture and the cycle repeats. Loading and unloading is done without interruption to cutting.

Consult us on your shaping jobs. A special Shaper may be very profitable to you.

Write for
Shaper Catalog N-6.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

dear editor:

Is The Businessman Religious?

Sir:

I enjoyed reading your editorial, "Is The Businessman Religious?" which appeared in the Sept. 30 issue.

Businessmen have been too reluctant in past years to tell of their political beliefs for fear of antagonizing people and of their work on many civic projects which meant many hours of work at no pay and, in many cases, generous giving of their own money. This in addition to their active support of a church of their own choice. I believe many have hesitated telling of their church activities because of fear of being ridiculed by their friends and business acquaintances.

There are many books being published on human relations, and these are all basically the teachings of the church, and how many have applied these principles to every day life.

The more management and labor are affected by God's influence, the smoother labor relations will move along.

Your conclusion hits the nail on the head. *R. H. Larson, Vice-President, Indiana Forge & Machine Co., East Chicago, Ind.*

Ceramic Coatings

Sir:

In your newsfront of the Oct. 14 issue, p. 85, I read a news item which I quote: "Flexible 'solution ceramic' coatings which can be sprayed on almost any solid surface at only a few hundred degrees temperature have been developed. Unlike conventional porcelain enamel coating, the solution ceramic coatings are not brittle. The coatings are reported to resist chemical attack at high temperatures."

We would be interested in examining and evaluating such coatings and would appreciate your putting us in touch with the manu-

letters from readers

facturer of them. *C. A. Luter, Research Chemist, Whirlpool Corp., St. Joseph, Mich.*

Further details may be obtained by contacting the Armour Research Foundation of Illinois Institute of Technology, Technology Center, Chicago 16, Ill.—Ed.

Make or Buy

Sir:

The article in the Sept. 23 issue entitled "Stampings—Should You Make Them or Buy Them?" is of great interest to us. Will you kindly send us 25 tear sheets or copies of this article and bill us for the slight charge involved? *A. A. Miller, Jr., Asst. Sales Manager, Commercial Shearing & Stamping Co., Youngstown.*

Reprints will soon be available; a few copies free, a nominal charge in quantities.—Ed.

Plastic Refractory

Sir:

Could you advise us to where we can obtain further information about the plastic refractory material mentioned at the bottom of the newsfront page of the Oct. 14 issue? Any information as to brand name or manufacturer will be greatly appreciated. *E. J. Zickfoose, Research Assistant, Griffin Wheel Co., Chicago.*

Further information on the use of plastic refractories for steel mill heating applications may be obtained from Ramtite Co., 2559 West 18th St., Chicago 8, Ill.—Ed.

Acceptance Standards

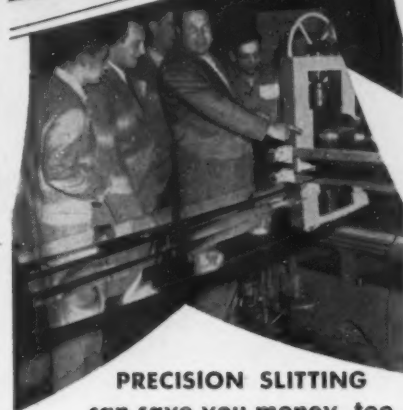
Sir:

We are desirous of obtaining six tear sheets of an article written by Mr. Stephen Maszy, entitled "Acceptance Standards for Magnetic Inspection Improve Quality, Lower Rejection Rates on Critical Parts," which appeared on pp. 114-115 of your Sept. 23 issue. *J. H. Dasdorf, Metallurgist, Shultz Steel Co., South Gate, Calif.*

typical scene at the 1954

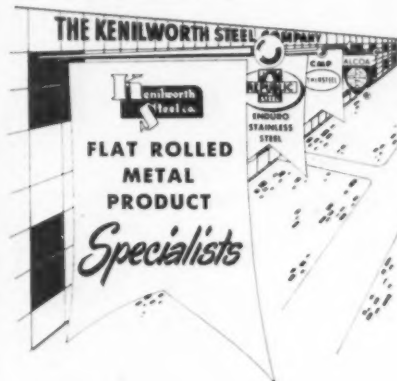
Kenilworth Klinic

Were you there? Here's a few of the crowd of thousands that visited us during the week long Klinic in May—viewing one of the Kenilworth Precision slitting operations, watching one of the many "ideas in action" of the annual exhibition.



PRECISION SLITTING can save you money, too

Expert tailoring of flat rolled metal products to your exact requirements is one of Kenilworth's services. Helps you eliminate waste, prepares your metal for maximum yield and assures you a precision product that can speed your production. And remember that Kenilworth offers this service for metal in your inventory that can be converted to your current production—frees working capital. Wouldn't it be a good time now to talk over with a Kenilworth representative your needs—aluminum coils or sheets, stainless sheets or coils, spring steel and the many items included in the complete Kenilworth line of flat rolled metal products.



750 BOULEVARD, KENILWORTH, NEW JERSEY
SPECIALISTS IN FLAT ROLLED METAL PRODUCTS
Telephones: N. Y. Cortlandt 7-3437 • N. J. Unionville 2-4900

Which comes first—

COAL or STEEL?



● We give up . . . Without coal, the vital steel industry of today could not exist. Without steel, the enormous tonnage of coal needed by the steel industry could not be produced or delivered. Here is another example of the interdependence of two basic industries!

We can report *this*, however: The mines in Baltimore & Ohio territory are prepared and equipped to go right along with the steel industry in its expansion program. Too, there are millions of tons of untapped reserves of coking coals available for development.

These coals are available in varieties for all coking needs. They are easily accessible, and in plentiful supply for long-range planning. Whatever your requirements, let us advise you. Just ask our man!



**BITUMINOUS COALS
FOR EVERY PURPOSE**



BALTIMORE & OHIO RAILROAD
Constantly doing things — better!

fatigue cracks

Salesman of the Year

Fatigue Cracks this week salutes Mr. J. M. Pickell, publisher of the Directory of Michigan Manufacturers. We received a letter from Mr. Pickell in which he offered to sell us his directory. This is not at all surprising. We are a pretty soft touch for directories inasmuch as we maintain a complete, up-to-date library of all such directories. We are constantly checking outside sources against our own records to properly catalog the metalworking industry. We expect and are grateful for such offers. As a matter of fact, if Mr. Pickell hadn't written us we would have written him.

Apparently, however, Mr. Pickell didn't know we would be such a push-over because he went to extreme pains in his effort to bring his fine directory to our attention. Mr. Pickell must be a salesman of the old school. No hardship, no personal inconvenience, no expense, no sacrifice too great to "get the sale." Well, judge for yourself. Here's how Mr. Pickell starts his letter:

Dear Mr. Coffey:

There was only one way I could get to Bermuda for a few days vacation, and that was to bring along with me work which I have been trying to get to for a long time.

Middle of last June we brought out a brand new issue of The Directory of Michigan Manufacturers . . .

. . . and we answered:

Dear Mr. Pickell:

I am writing this from Paris.

As soon as I received your letter I dropped everything and rushed over here to give your offer everything I've got.

Have been here only a week now but am beginning to lean

by William M. Coffey

in your direction. Am not promising a thing, but perhaps one more week and I'll come up with the answer.

We bought the directory.

Joke No. 5,789

Bigdome, the busy executive, snapped at his secretary, "Where's my pencil?"

"Behind your ear, sir," she replied.

"Oh come, come," retorted the big shot, "I'm a busy man. Which ear?"

Our 5789th attempt to be relieved of writing this column. The evidence sure mounts up.

Puzzlers

Our Oct. 14 puzzler seemed to have puzzled most of our mathematicians, but brought into the puzzler fold a lot of other fine IRON AGE readers who know where and when to place a comma. The answer: "John, where Jim had had 'had,' had had 'had had.'" "Had had" had had the teacher's approval." Winners: nobody except Charlise. But L. W. Randerson, Elaine Larson, George McCue, Roberts Munger, W. P. Rogers, Mildred Chapman, Bill Jorgeson, Jim Toohey and Elizabeth Rowlands came very, very close. This is the way to run a puzzler's column! New fruit.

New Puzzler

A man was talking to a friend about his son. "When I am as old as my father is now," said he, "I shall be four times my son's present age, but my son will then have reached my present age. It is a curious coincidence that my father's age, my son's age and my own age at the present moment add up to a century." The problem is to find the three ages. If this sounds familiar, don't be fooled.

take another
look at your



WELDING
ELECTRODE
COATING

. . . here is a scientific blend of upwards of ten different chemicals and minerals that transform a piece of wire into a valuable production tool. But the rod is no better than the quality of the materials that comprise its coating.

Foote's exacting production control assures the vitally important chemical and physical uniformity of all its coating materials. That is why Foote is recognized as the leading supplier of raw materials that go into the manufacture of quality welding electrodes.

Detailed information is given in the booklet "Foote Raw Materials for Welding Rod Coatings." Write for your copy.

Foote
MINERAL COMPANY

438 Eighteen W. Chelton Bldg.,
Phila. 44, Pa.

RESEARCH LABORATORIES: Berwyn, Pa.
PLANTS: Exton, Pa.; Kings Mountain, N.C.;
Sunbright, Va.

PRECISION STRETCH FORMING JET ENGINE AND AIRFRAME COMPONENTS

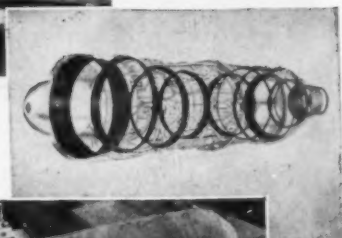
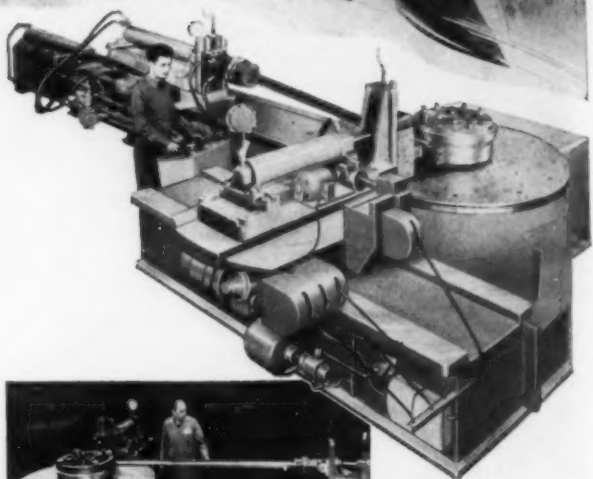
METALLURGICAL VALUES increase automatically when material is stretch formed by Bath Process.

MACHINING TOLERANCES are held when parts are being formed by the Bath Process of stretch forming.

MANY COMPOUND SHAPES are produced in one operation in the Bath Radial Draw Former, that are impossible to form by any other method.

LIGHTER AND STRONGER PARTS result when two or more sections are combined, thereby eliminating a number of splices, also decreases weight in air frame and jet engine sections.

ENTHUSIASTICALLY ACCLAIMED by many of the world's largest aircraft manufacturers.



Send for one or both of these **FREE** catalogs without obligation on your part. They contain a wealth of information on Stretch Forming, Compression Forming and Radial Draw Forming.

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SOLON, OHIO

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Increased Use of Thermal Power Seen

Power engineers see increased dependence on thermal power for production of electricity in the years ahead. At present rate of load growth—400,000 to 500,000 kw per year—most readily available water power sites and potential river development areas will be used up in the next 20 years, some experts predict.

Braze Heat Exchanger Assembly Rapidly

One million Btu's per hour are developed in a 50 x 9 in. furnace chamber built to braze large heat exchanger tube-tubesheet assemblies. Precision heat control prevents damage to aluminum cover plate less than 1 in. from the 1½ in. thick steel tube sheet. Some 38 copper tubes are simultaneously silver brazed at 1300° in 5 minutes.

Fire Extinguisher For Cramped Areas

Handy for putting out blazes in cramped areas where ventilation is hard to control is a new, portable water spray fire extinguisher developed by the Navy. Designed primarily for submarine use, it has performed well in tests against electrical, fuel oil, wood, and fabric fires.

Endurance Test Time Sliced

Recently developed endurance test equipment has greatly speeded the testing of automotive component parts. The equipment can test for part life under varying loads closely simulating road conditions. In one case a rear axle shaft received in 1 hour the "driving" strains ordinarily met in 250 miles of road testing.

For High Temperature Furnace Heating

Electric heating elements made of silicon carbide and designed for high temperature furnace use have been developed by a British company. The heating element is a silicon carbide tube in which the hot zone is a spiral. Temperature range is between 1472° and 2867°F.



DOUGLAS AD-6 SKYRAIDER

Is the Navy's and Marine Corps' standard attack bomber—used extensively in the Korean War.

15,485 LB. HAMMER DIE MACHINED ON AXELSON 100" GAP BED LATHE

Turning large contour work and odd shapes such as aircraft landing struts are machining problems that are easily handled on Axelson Gap Bed Lathes.

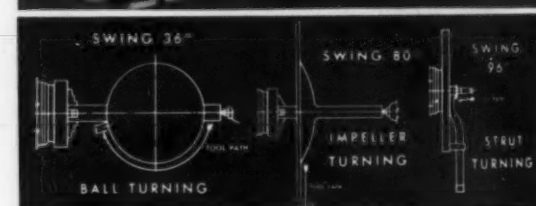
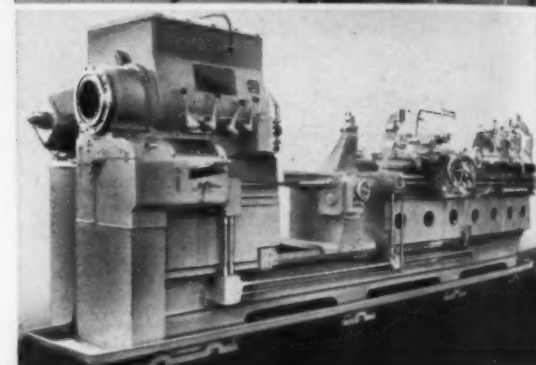
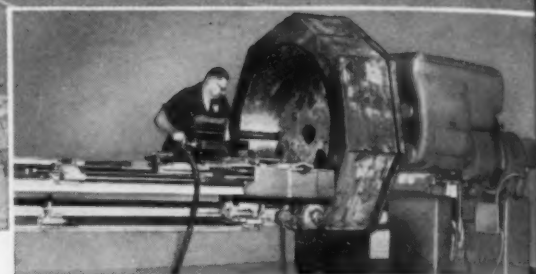
This particular lathe is machining a 15,485 lb. hammer die for forming the cowl for Douglas AD-5 and AD-6 "Skyraiders." The Axelson ball turning attachment permits the I.D. to be finish machined to a template, turn a radius on the bottom, after which the bottom is faced. Note the entire weight of the die is mounted on the spindle without tailstock support.

The machine is powered with a 30 H.P., D.C. motor with electronic control that permits infinite speed changes from 0.4 to 308 R.P.M. Motors up to 75 H.P. may be supplied for heavier work when required.

Similar machines equipped with standard Axelson attachments are finding applications in heavy industry for machining large irregular shaped parts, in the maritime industry for turning turbine rotor blades with integral shafts, and in the oil industry for turning heavy oil well equipment. There is no limit to the application of Axelson Heavy Duty Lathes for they serve all industries.

It will pay you to consider Axelson for solving your heavy duty turning problems economically. Call our qualified distributor in your locality or write direct to the factory for recommendations. Your request for assistance is without obligation.

Write for literature describing Axelson Heavy Duty Lathes, Models 16", 20W", 20", 25", 32"; Precision Tool Room Lathe Models 16", 20"; Gap Bed Lathes 25"/100", 25"/125" or Special Machines.
6150 BOYLE AVE., LOS ANGELES 58, CALIF.



MACHINE FACTS

- Machine—Axelson 100" Gap Bed Lathe
- Swing Over Ways, Gap Closed—34½"
- Swing Over Ways, Gap Open—100"
- Spindle Bore: 11" Diameter
- Spindle Speed Ranger: 0.4 to 308 RPM
- Electronic Control provides infinite speed changes
- Ball Turning Attachment: 9" to 36" Dia.
- Distance Between Centers, Gap Closed: 144"
- Distance Between Centers, Gap Open: 216" Max.
- Machine Weight: 60,000 Lbs.
- Note: For large work motors up to 75 H.P. can be supplied.



HEAVY DUTY



PRECISION



HOLLOW SPINDLE



GAP BED



ELECTRONIC TRACER



HYDRAULIC TRACER



AXELSON MANUFACTURING COMPANY DIVISION
PRESSED STEEL CAR COMPANY, INC.
LOS ANGELES 58, CALIFORNIA



DIRECT FACTORY SERVICE AVAILABLE FROM ST. LOUIS, PHILADELPHIA, KANSAS CITY, BUFFALO, AND LOS ANGELES
AUTHORIZED DISTRIBUTORS IN ALL PRINCIPAL INDUSTRIAL CENTERS

PENTAGON: Picks Industry Teammates

Defense planners list wartime suppliers . . . Chart basic materiel needs . . . Military agencies select firms, allocate production targets . . . Project additional war capacity needs—By R. M. Stroupe

♦ TEAMING the technical knowledge of U. S. industry with the planning capabilities of national defense strategists is the foremost job facing military logistics experts today.

Industry appreciates the scope and significance of this problem—at least, as much of industry as has been told of Defense Dept.'s production mobilization ideas. Too often the mobilization planners find that the word hasn't reached enough of the right people.

Industry's Battle Stations

This is the situation at present with the revised Production Allocation Program. Many companies which could contribute greatly to national emergency efforts have not been told what the program is designed to do. Others have been allowed to believe it's the same program which existed during the Korean war.

Among the federal officials who this year put into use a new blueprint for obtaining needed military items during wartime, the program is viewed as the critical mechanism for getting the best results from the coordination of U. S. manpower, machines, and materials.

Its aim: To find battle stations for industry.

Those who have been concerned with the revised program since its inception believe it will go far toward balancing strategic planning with industrial reality.

There are limitations on this program. It is not intended, for example, to cover manufacture of such "shelf items" as common-

purpose nuts and bolts. It is designed specifically to insure the adequate production of those items most needed to equip the military machine for an all-out hard fight.

Another important point is that PAP does not in any way conflict with Business & Defense Services Administration industry studies. BDSA studies industry in the lump sense, so to speak, as related to total production needs.

Key to PAP is the Production Planning List, which in popular terms has become the "list of 1000 items." There was an earlier interim list of about 1000 items, logistics experts point out, but it was an interim list only.

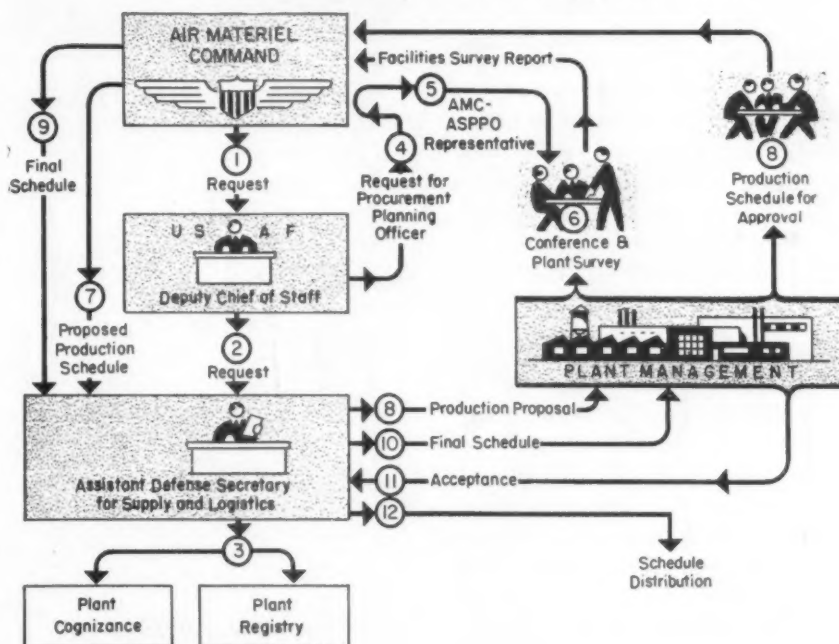
The long-haul Production Planning List is just being put into

final form. There is now a working copy of this roster of essential end-items, but its contents may be trimmed or otherwise altered before the final document is ready for use.

In the ultimate list will be, very roughly, about 1000 end-items, consisting of the hard-core, vitally-needed products without which U. S. military defense schemes would not work. It will not include parts or components, and by direction will leave out such "morale" items as soap flakes and nylon stockings.

Intended use of a product will determine whether it goes into the final list. To be included, an item must be designed for one or more of the following: "survival and retaliation; mainte-

How Military Picks Supplies



SPECIAL REPORT

nance of health; combat efficiency."

Once a qualified item is entered on the list, logistical experts make note of the quantity now being produced and project a quantity that would be needed in wartime. That done, it is necessary to find how to make up the difference between the two figures.

List War Plants

Achieving this fill-the-gap production is a job which can be done only by the best possible teamwork between industry and the military. It's a task requiring first-class management cooperation with designated armed services representatives.

Working tool of the Defense Dept. in lining up sources of dependable production is a three-volume roster of about 34,000 U. S. plants. It's called the "Alphabetical Register of Planned War-time Materiel Suppliers," and it's now being given a thorough review as a means of eliminating non-applicable information.

When the review is completed, the register may contain data on more or fewer firms than at present, but the size is not of prime significance. The important element is its usability.

Gets Two Breaks

Two basic advantages accrue to the producer whose firm is registered with the Defense Dept. First, he gets a running start in handling military production following any future M-Day. He may even have a production line in readiness for wartime output. Secondly, he becomes a recognized bidder in those areas of procurement where he knows he is equipped to produce the items needed.

The registered firm capable of turning out one end-item or a dozen required in a shooting war works with the military in setting up a tentative production schedule. This schedule is not legally

binding, but it gives the armed forces an approximation of the quantity of items which will be ready on M-Day plus X days.

Establishment of a schedule begins when an Army technical service, a Navy bureau, or the Air Materiel Command requests that a given plant be registered on the alphabetical list. If AMC, for example, is the initiating agency, this is roughly the procedure that is followed:

1. AMC sends its request to the USAF Deputy Chief of Staff, Materiel.

2. The DCS/M approves and forwards the request to the Assistant Defense Secretary for Supply & Logistics.

3. Next, the Assistant Secretary assigns planning cognizance to the individual service and registers the plant.

4. DCS/M places with AMC the responsibility for naming an Armed Services Procurement Planning Officer (ASPPO) to work with a management representative in outlining a schedule.

5. AMC assigns an officer as ASPPO, who then represents not only his service but the Assistant Defense Secretary as well.

6. Conferring with executives of the plant, the ASPPO explains the desired program and surveys the facility with a management representative — his opposite number.

7. Using the facility survey,



"I think we've struck ore."

What Military Buys

Some manufacturers may be in doubt as to what common categories of items are bought by the services. An answer is available in the publication "Purchased Items & Purchasing Locations of the Dept. of Defense." A companion pamphlet is "How to Sell to the Dept. of Defense."

These may be obtained at any major military buying agency or ordered from the Government Printing Office in Washington. Combined price of the two is 50¢.

AMC drafts a proposed production schedule.

8. The ASPPO offers the proposal to management. This officer and the management representative then work out a feasible schedule, which is submitted to the procuring agency for approval.

9. AMC then suggests a final schedule for management to approve.

10. The ASPPO transmits this proposal to management.

11. If management agrees, it executes acceptance of the schedule.

12. ASPPO distributes the accepted schedule.

Must Convince Services

Unhappily for the firm not now named on the alphabetical list, getting on the roster is a one-way operation (see Step 1, above). Instead of a company applying for listing, a military agency must take the positive initiating action.

This means that a firm wishing to equip itself for wartime defense work must convince one of the services of its ability to turn out an item or items essential to the needs of the military program.

It's not necessary that the firm be set up to manufacture an essential product now.

What is important is that the military be sold on the potential value of the company to national defense. Then, by putting in a request for entry of the firm on the alphabetical list, the interested agency starts the wheels moving.

PROFESSORS: Learn From Industry

Fellowships-in-Business program has given 500 college professors a beneficial, 6-week look over management's shoulder . . . Results in factual data to bolster academic theories, right wrong impressions.

♦ **BETTER UNDERSTANDING** of practical management problems came to 123 college professors who spent 6 weeks last summer in the offices and plants of 72 U. S. companies.

No happy accident, the professorial visits to industry were the fruits of the Fellowships-in-Business Program sponsored by Foundation for Economic Education, Inc., Irvington-on-Hudson, N. Y.

Aimed at providing U. S. educators with a hard core of facts to ballast their theoretical knowledge of business methods, or to counter-balance mistaken impressions of business' aims, Fellowship Program has proved a two-way street.

500 Educators Participate

Program was started in 1948 by FEE's Dr. W. M. Curtis. That first year nine Fellows from seven colleges were sent to six different firms for the 6-week training period.

Since then, nearly 500 Fellows from 246 different colleges and universities have visited 121 participating firms. Behind the plan's growth lies the enthusiastic response of educators and business men alike. Of 65 professors questioned, 55 rated the program as "highly valuable," 10 as "good."

Comments from executives of participating firms show similar appreciation: "We provide college professors with opportunities to improve their own work . . ." "We benefit from a closer relationship with the college represented."

A concrete example of practical value of the Fellowship Program was reported by a participating firm: "One visiting professor showed us how to rebuild our li-

brary. This alone was worth thousands of dollars to us."

Program's indirect benefit to industry—perhaps more important—is summed up by an executive in this way: "Since the professors are recognized thought leaders, academically and otherwise, this opportunity extended to them is a project on which business organizations can expend their time and money in the interest of better public understanding."

One result of the educators' broadened outlook is mirrored in the comment of a marketing professor: "You (the firm he visited) have indeed made a lasting and favorable impression on us. I trust the benefit is in part reciprocal and that a good bit of it will rub off on our students."

Another professor wrote: "The benefits of the program accrue to the college student—in whom industry finds much of its manpower potential—in a more personalized, practical approach to industry's problems and industry's role in the American economy."

Cost of the Fellowship Program



"Some patients are frightful bores."

is borne entirely by the participating firms. Professors are furnished with transportation to and from the plants and their homes, given \$500 to cover expenses for the 6-week period. The stipend is not intended to make participation in the program a substitute for a summer job.

Program's objective — to give professors a fairly comprehensive picture of the operations of a business firm—is accomplished through interviews with supervisors, top executives which give the educators a first-hand look at such problems as pricing, cost analysis, incentive systems, research, finance, industrial and public relations.

Candidates for Fellowship-in-Business program are permitted to choose the type of firm they are most interested in studying within limits of such broad categories as manufacturing, finance, insurance, transportation, distribution, etc.

List of participating firms contained representatives of almost every type of business, from steamship lines to stockbrokers.

Younger Teachers Predominate

For the most part, fellowships are granted to young college and university staff members on the instructor, assistant and associate professor levels. However, program has included a number of deans and department heads.

Majority of the professors are from either departments of economics or schools of business. However, there is a growing interest in participation on the part of teachers from the Humanities, and candidates from English, History and other departments were included in last summer's program.

STEEL: Third Period Earnings Dip

Industry profits 32 pct under third quarter 1953 . . . Nine months' totals off 22 pct this year . . . Ingot output off 28 pct for quarter, 30 pct for 9 months . . . Blame inventory cuts most—By G. G. Carr.

◆ STEEL INDUSTRY earnings in third quarter of 1954 dipped approximately 32 pct below last year's figure for the same quarter. Totals for the first 9 months of the year were 22 pct below the same period in 1953. Production correspondingly dipped 28 pct for third quarter and 30 pct for first 9 months, compared to the same periods last year.

These figures are revealed by a compilation of steel company financial reports just completed by THE IRON AGE. Included in the compilation are 21 companies accounting for about 90 pct of the nation's steel ingot capacity.

See Good Quarter

The 21 companies together earned \$1,769,811,000 in third quarter of this year compared to \$1,197,623,000 for the quarter in 1953. Nine months' totals for the 21 firms were \$3,804,482,000 in '54 against \$4,899,903,000 for the same period last year.

While company - by - company figures reveal some fairly radical departures from the average (and those usually in a downward direction), the overall industry earnings picture is better than many had expected. Steelmakers are generally optimistic about fourth-quarter prospects, are relieved that they came through the inventory adjustment period in third quarter as well as they did. The steel inventory correction by consumers is generally credited as the major factor in the past period's relatively depressed status.

Bethlehem's Eugene Grace summed it up last week: "Anyone who wants steel now has to pay for it." The fat has been pared off. And U. S. Steel's Fairless

stresses the encouraging fact that early fourth-quarter pickup in steel buying has been general, coming from many industries.

Not surprisingly, the larger, more diversified integrated producers made better showings in the quarter than the specialty mills. Bethlehem, for example,

calls its record "representative," points out that shipments of 2,222,000 net tons were very close to new orders of 2,213,000 tons.

And third-quarter earnings show that if the steel industry's mythical breakeven point existed, it would be a lot lower than those who believe in it had pegged it.

Steel Company Earnings

Company	Third Quarter '54	Third Quarter '53	Nine Months '54	Nine Months '53
U. S. Steel	\$ 44,323,860	\$ 61,706,264	\$138,174,974	\$166,723,028
Bethlehem Steel	25,895,487	34,030,204	84,453,837	93,525,340
Republic Steel	10,302,001	14,048,033	35,093,946	42,758,557
Jones & Laughlin Steel	4,387,000	8,807,000	16,534,000	25,170,000
National Steel	6,174,370	13,003,384	19,199,718	37,078,116
Youngstown Sheet & Tube	4,048,000	7,278,000	12,692,000	22,961,000
Armco Steel	10,167,361	10,042,784	29,168,478	26,121,317
Inland Steel	6,875,977	8,371,796	26,293,646	24,049,317
Colorado Fuel & Iron	1,027,096	2,483,797
Wheeling Steel	1,912,920	2,939,795	6,295,944	9,995,443
Sharon Steel	501,578	1,681,034	1,145,840	5,782,001
Kaiser Steel	969,401	3,347,978
Crucible Steel	380,632	1,637,566	1,693,027	5,560,036
Pittsburgh Steel	481,437	99,188	800,310	4,549,800
Barium Steel	15,314	559,994	-81,234*	2,762,069
Allegheny Ludlum Steel	546,886	2,038,776	2,438,558	6,300,421
Granite City Steel	1,049,814	2,285,929	2,599,746	5,474,198
Detroit Steel	190,938	1,195,221	758,681	4,695,085
Alan Wood Steel	143,557†	900,567	589,533	2,454,885
Copperweld Steel	128,640	605,728	665,302	2,443,353
Rotary Electric Steel	13,539	548,559	978,405	2,066,741
Keystone Steel	1,741,741	1,248,831	5,162,903	4,131,331
Continental Steel	370,022	270,098	1,267,903	1,157,785
Eastern Stainless Steel	1,193,839	816,727

* Net Loss

† After special charge of \$94,000 for retirement of bond issue



STOP-WELD pattern about to be applied to aluminum plate.



SANDWICHED plates are spot-welded to hold them for roll-bonding.

FORMING: Develop Tube Method

New twists to old bonding method permit forming of complex tubing patterns in solid sheet . . . Refrigerator use is first . . . See vast future markets.

♦ NEW ANSWER to economic forming of complex tubing patterns has been devised by Olin Mathieson Chemical Corp. It's a new twist on the old process of roll-bonding and it has successfully finished its commercial shakedown cruise in evaporator plates for a major refrigerator manufacturer.

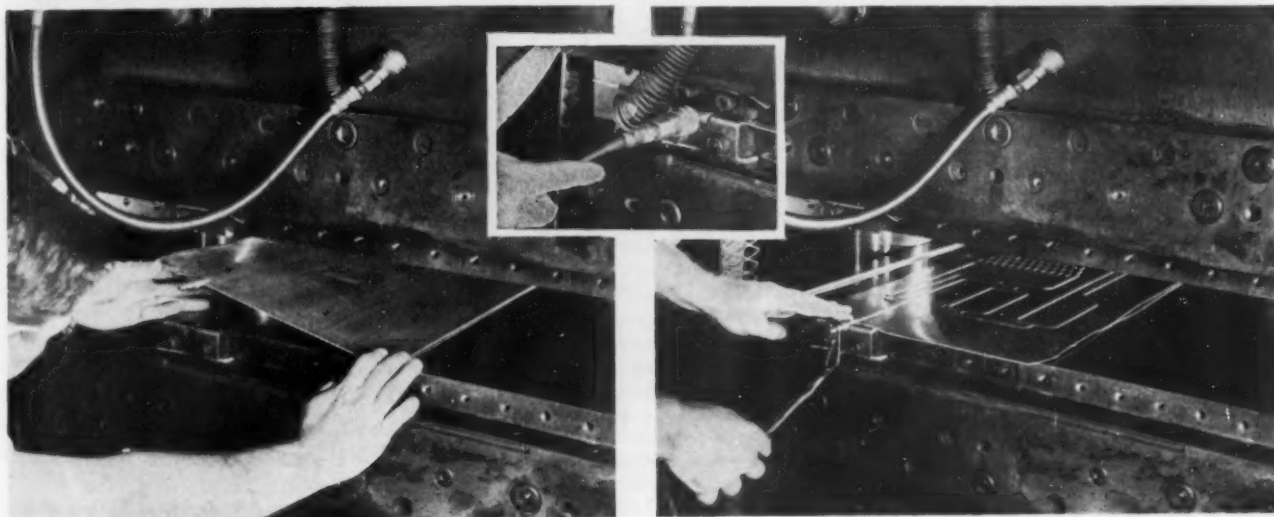
Here's how it works: A pair of flat metal plates, aluminum in the evaporator case, is cleaned and the pattern of what will become the tubes is silk-screened onto one. "Paint" used to form the pattern is a stop-weld material which will later prevent the two pieces from

bonding under high temperatures and pressures. Up to here it's very similar to production of printed electronic circuits.

Roll to Size

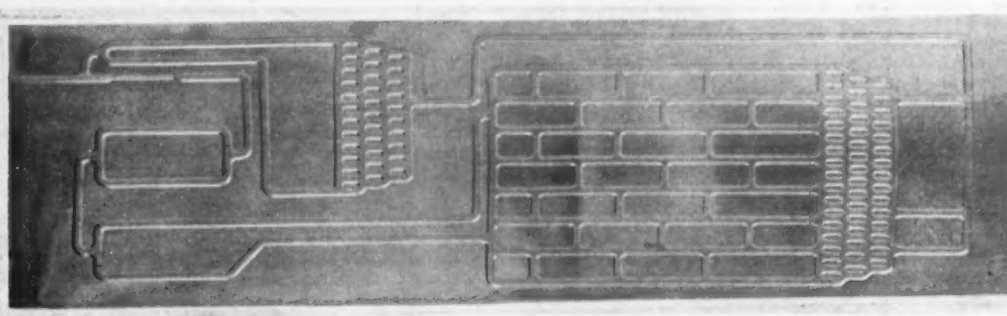
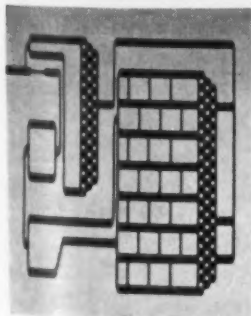
Plates are then sandwiched with the stop-weld between and spot-welded to hold them in position for rolling. First rolling operation is hot, welding the mating surfaces except where the pattern has been applied. Further cold-rolling reduces the thickness and elongates the now homogeneous plate.

This approximately triples the length of the pattern which was



INSERTING rolled sheet in press. A needle has been inserted at lead-in. Hydraulic pressure is applied (inset)

after plate is firmly clamped in position. After inflation the evaporator plate is removed.



CONTRAST between patterned plate (left) and completed evaporator plate shows "stretch" effect of rolling.

the A-B-C of M-S-T

A ALWAYS
MAKES
POSSIBLE
B BETTER
PRODUCTS
C AT LOWER
COST



Michigan Electric Resistance WELDED STEEL TUBING

A
Quality
Product

Muffler Inlet Pipe

ROUND

$\frac{3}{8}$ " to 4" O. D. 8 to 22 gauge
SQUARE-RECTANGULAR

$\frac{1}{2}$ " to 2" O. D. 20 gauge

1" to 2 $\frac{1}{2}$ ", 14, 16, 18 gauge

Carbon 1010 to 1025

Michigan Tubing

has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

This is an excellent example of Michigan workmanship in the performance of several intricate fabricating operations to most exacting tolerances.

The pipe manifold end is expanded to 2.225" I. D., a flange superimposed, and a flanged ferrule press-fitted for immediate assembly to exhaust manifold. Two bending operations with minimum reductions permit full flow of gas to hold back-pressure to a minimum. Muffler end diameter of tube is increased by expanding and a bead superimposed to form a "gas-tight" joint.

Michigan engineering and fabrication know-how make for accuracy and economy in the manufacture of this and many other tubular products. Why not consult Michigan about your fabrication problem.



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MANUFACTURING

pre-designed to "grow" to the proper proportions.

After annealing, one end of the plate is trimmed, exposing the lead-in end of the pattern. A needle, analagous to the one on a football pump, is inserted here and the plate is placed between platens on a hydraulic press. Hydraulic pressure is applied through the needle to inflate the non-welded pattern. Stop-weld is flushed out, passageways are dried and edges are trimmed.

According to Olin Mathieson, the process works well on aluminum, copper and copper alloys, and carbon and stainless steels.

How does it stack up costwise? Extremely well. Retooling costs for the evaporator plates were \$50 as compared to an estimated \$50,000 and retooling time was cut from the usual 6 months to a week.

Further cost reductions accrue in the design changes the process makes possible. Header or accumulator may be incorporated directly into the pattern, eliminating other fabricating and brazing operations. Other modifications result in similar savings.

Build New Plant

Any pattern that a draftsman can put on paper is possible. And, since as many as six sheets can be bonded simultaneously, parallel crossed or multiple tubes can be made. "Possibilities are so vast," said Huntly Campbell, general manager of the Metals Div., "we are still dreaming." With experience gained in using the technique for some 18 months, the firm is nearing completion on a \$5 million plant at East Alton, Ill., which is designed to put the process on a mass production basis for other industries. Operation is scheduled to begin this year.

Olin Mathieson anticipates fruitful markets in any industry concerned with heat exchange. Among these are numbered automotive aviation, air conditioning, home construction, railroading and many others. Gazing farther, this method may even speed solar heating for homes, according to Massachusetts Institute of Technology

FABRICATORS: Competition Razor Sharp

Steel fabricators putting up plenty of tonnage, but competition is razor sharp . . . Claim some jobs bid below costs . . . Bookings lag as steel turns easy . . . But good year predicted in 1955—By W. V. Packard.

♦ **STEEL FABRICATORS** have been riding high on the construction crest, but it hasn't all been smooth sailing. Nor is there any sign that it ever will be. Theirs is an intensely competitive industry, and even when bookings and shipments are at high levels they are haunted by competition.

So it is today. Competition stalked the halls of the Greenbrier (White Sulphur Springs, W. Va.) last week as steel fabricators met to take stock of their business and exchange views on how to improve their industry and how to beat competing materials.

Corridor talk revealed plenty of confidence in the overall construction market. Although fabricators admit that industrial construction is likely to decline further in 1955, they are very optimistic about the amount of work coming up on highways, bridges, schools and hospitals.

There'll be plenty of fabricated structural steel business again in '55, but not one seems completely sure that he'll get his share. While complaints of razor-sharp bidding were not loud, they could be heard in almost every conversation—like a low but persistent overtone throughout the meetings.

Shipments Up 5.5 Pct

Complaints varied from "They must be crazy to submit a bid like that" to "I don't see how anyone could do that job cheaper than us and still make a profit" to "each job has twice as many bidders as it used to have."

Statistics of the industry reflect the very high level of activity. In the first 9 months of this year shipments of fabricated structural steel totaled 2,424,841 net tons, an increase of 5.5 pct over shipments in the same period 1953.

It is estimated that total shipments for 1954 will reach 3.2 million tons, highest since the all-time peak in 1929.

Bookings for the first 9 months of this year totaled 1,904,003 tons, about 15 pct less than the corresponding period of 1953. Backlog of unfabricated orders at the end of September this year stood at 1,904,003 tons, a decline of 35 pct from a year ago.

At first glance the declines in bookings and backlog would appear to forecast a serious decline in future operations. But the changing steel market has played a major role in these figures.

While 1953 was a year of steel shortage—especially psychological—1954 has been a year of steel

abundance, with a wave of inventory correction engulfing nearly all steel consuming industries. With steel readily available on short notice in 1954, there has not been the incentive to order far in advance of needs. Customers have been confident they could play it close to the vest and still get the job done because there would be no problem in obtaining steel.

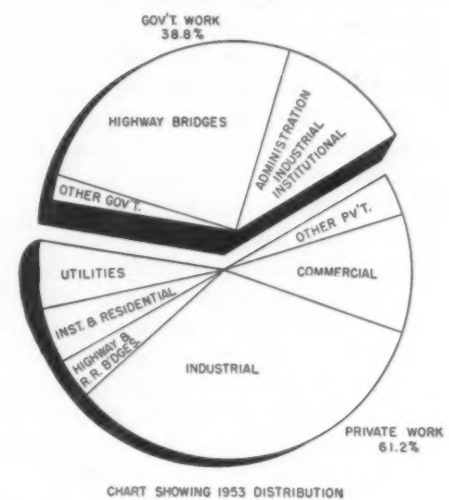
A mild upturn in the economy was predicted at the meeting by M. R. Gainsbrugh, chief economist, National Industrial Conference Board. He said the economy hit the bottom of a mild recession early this year and has been on dead center since then. But now it is starting to improve slowly and will continue to do so.

Fabricated Structural Steel Bookings by Source

(thousands of net tons)

	1951	1952	1953	7 mos. 1954
GOVERNMENT				
Administration	18	34	7	21
Institutional, educational	73	127	75	51
Industrial & other	278	254	243	88
Highway Bridges, trestles & viaducts	331	504	887	382
Dams, gates & appurtenances	18	17	11	6
All other public	64	62	48	23
PRIVATE				
Industrial	1,483	940	939	474
Commercial	129	107	282	155
Residential	9	7	17	28
Institutional, educational, religious	88	72	116	100
Utilities	211	187	157	53
Highway Bridges, trestles & viaducts	62	96	57	33

	1951	1952	1953	7 mos. 1954
Railway Bridges, trestles & viaducts	35	53	35	32
All other private	132	84	103	55
TOTALS	2,931	2,504	2,767	1,501



PLANNING: How to Meet Estate Taxes

Minimizing estate taxes is not enough . . . Cash must also be available to pay those unavoidable . . . There are several sound methods of assuring enough liquid assets to help keep the business going.

◆ **PROPER** estate planning requires not only that death taxes be minimized, but also that money be made available to pay them. It's as simple as that, but the problem of liquidity is frequently overlooked by the man whose estate will consist primarily of a closely held business which cannot be sold without sacrifice.

The nature of the problem and ways of meeting it is illustrated by two case histories—one of a man who wanted his business continued after his death, and one who wanted it sold.

Business to Be Continued

Jim Clark owned an incorporated processing plant worth about \$325,000, a home worth \$35,000 and \$150,000 worth of life insurance. He ran the business with the help of his son, who did the lion's share of the work and who had become primarily responsible for the plant's operation.

In many ways, Jim's estate was carefully planned. His insurance was set up under an instalment option for his wife with any balance unpaid at her death being subject to disposition by her will so that it would qualify for the marital deduction. His house was jointly held with his wife, also qualifying for marital deduction.

By his will he left his business in trust (with broad powers to continue the business) for his son, income to be paid to Jim's wife during her life. He provided that to the extent he had not taken full advantage of the marital deduction by his insurance and jointly held residence, a sufficient number of shares of his company to make up the difference should be subject to disposition by his wife's will, the remaining shares

to pass tax free to his son at her death. This would hold death taxes to a minimum and the business would be continued for the benefit of the family.

But there was a serious error in Jim's estate plan. Where was the money coming from to pay the death taxes?

What About Cash?

Even after taking full advantage of the marital deduction, the federal tax in Jim's estate would be close to \$50,000 and neither Jim nor his business would have that kind of money lying around. The best that could happen would be that his executors would be able to arrange for an extension of the due-date of the tax or to borrow the necessary cash. The worst would be a forced sale of the business Jim had been so careful to conserve for his son.

Jim talked his plan over with



"I'm retiring next week, and I wonder if you gentlemen could give me any pointers on how to waste time?"

an insurance agent who was an experienced estate planner. There were plenty of liquid assets available for the insurance *provided he released the proceeds from the freezing effect of the settlement option*. Needless to say, the solution is not always that easy.

Sources of Tax Funds

An important job of the estate planner is to make a careful estimate of the maximum death tax liability, bearing in mind that the wife may not survive and taxes will be much higher with no marital deduction available. Arrangements should then be made for a reserve of liquid assets in the estate from which the tax can be paid. Here are the common sources for the payment of death taxes which should be developed in a well-planned estate:

Insurance . . . Insurance is the ideal reserve for death taxes. Care must be taken to see that the beneficiary designation will make the proceeds available to the executor. This means staying away from rigid settlement options. Generally, in cases where the estate is left in trust, the policies should be made payable either to the estate or to a trustee under an insurance trust incorporating the same plan of disposition as the will. The latter method avoids estate inheritance tax on the insurance proceeds in many states. If the executor needs cash for payment of estate taxes, he can borrow it from the insurance trust or transfer non-liquid assets to the insurance trust in return for the cash.

Marketable Securities . . . A reserve of cash or marketable securities outside the closely held business is just as good as insur-

ance for those who are fortunate enough to be able to save for this purpose. Where insurance is inadequate and the owner is uninsurable, every effort should be made to create such a reserve through savings.

Cash in the Business . . . Sometimes liquid assets owned individually are insufficient for death taxes, but there is available cash in the deceased owner's corporation sufficient for this purpose. This cash can be made available to the deceased owner's estate through the redemption of some of the estate's stock. There is a special provision in the Revenue Code permitting this to be done under certain conditions and to the extent necessary to pay death taxes and other charges without risk of such a redemption being treated as a taxable dividend.

This method of paying death taxes while highly advantageous in many cases should be used with care. In the first place, the corporation's cash position should not be weakened, particularly when conditions are likely to be upset by the principal owner's death. Also, if there are substantial minority interests, the estate's voting strength will be reduced by redemption of interest.

Loans . . . Where no other funds are available as would have been the case with the estate of Jim Clark if he had not changed his insurance, the executor can arrange for a private loan, pledging or mortgaging estate assets, to be paid off in the course of years. Provisions permitting this should be included in well-drawn wills for substantial estates.

As an alternative to a loan, the code provides that the government may, in hardship cases, postpone the due-date of federal death taxes up to 10 years. This is discretionary with the taxing authority, however, and a bond will probably be required.

Avoid Forced Sale

Suppose there is no one in the family interested in or capable of carrying on a man's business after his death. At first glance it might seem that he had no problem because the business will be sold by

Executors Need Cash On Hand

Failure to have sufficient cash available to meet inheritance taxes can put a serious burden on your heirs, often force abandonment of your careful plans for your estate. The various methods of insuring your executors this cash are discussed in this article, part five in a series THE IRON AGE is presenting in cooperation with Provident Trust Co. of Philadelphia and John J. Buckley, Provident vice-president. Earlier articles in this series have appeared in the issues of Sept. 16, Sept. 30, Oct. 7, and Oct. 14. Others are now in preparation.

his executors anyway. Actually he should be just as concerned as the man who wants his business continued. Buyers who will pay a good price for a closely held business do not grow on trees. Time will be required to enable the executor to develop a good sale. Meanwhile, taxes must be paid and the executor and trustee must have adequate powers spelled out in the will to enable him to keep the business operating.

As an alternative, a sale at the death of an owner can be arranged while he is still living. This involves an agreement with the prospective purchaser and the assurance that the latter will have enough money available at the time to meet the obligation. Such arrangements are particularly valuable in cases where a company is owned by two or more persons who do not want outsiders in the business.

Keeping Control

Take the case of the Taylor brothers—Charles, Tom and Bill. None of them wanted members of his family to continue in the business after his death and none of them wanted to be bothered with minority interests of in-laws or outsiders if one of the others died.

The plan they adopted is frequently used in such cases: They all signed an agreement restricting transfer of their interests during their lives and providing that when any one of them died, the survivors would buy out his share at a price based on the book value when death occurred. To make sure that the survivors would have the necessary funds to pay for the stock, each brother agreed to carry insurance on the lives of the other two.

There are strong advantages to such a plan. Suppose, for example, that Tom dies. In the first place the estate is assured of a prompt liquidation of his interest at a fair price; death taxes can be paid and the remaining proceeds invested more conservatively for the benefit of his widow and daughters. In the second place, if the purchase price is reasonable, negotiated in good faith and there were proper restrictions on lifetime transfers, the government is bound by the contract price in valuing the shares for federal death tax in Tom's estate. Finally, Charlie and Bill are happy because outsiders are not let into the business.

There are many variations of this type of buy-and-sell agreement. Sometimes there are income tax and other advantages to having the corporation carry the insurance and redeem the deceased shareholder's stock rather than having each shareholder insure the other. Formulas for fixing the purchase price also vary from case to case; some agreements fix a dollar amount to be revised annually. Or, the agreement can set forth a procedure for fixing the purchase price through independent appraisals.

There is no standard answer to the problem of liquidity in estates. The advice of an experienced attorney is essential, particularly if you get into business insurance and buy-and-sell agreements. On the other hand, the solution may be as simple as in the case of Jim Clark. The main thing is to be aware of the problem so that sensible provisions can be made to pay for the costs of dying without disturbing your business, your home or any other asset which may be difficult to liquidate.

For A BETTER PRODUCT...

... USE FAIRFIELD GEARS

★ If GEARS are a vital part of the product you make, there is no finer recommendation for the QUALITY of your product than to be able to say it is equipped with "FAIRFIELD GEARS."

Long producers of the gears needed in high grade trucks and tractors, Fairfield now brings the same standards for GEAR PERFORMANCE to a wide variety of products: Agricultural Implements ... Power Shovels ... Machine Tools ... Diesel Locomotives ... Road Graders ... Lift Trucks ... Road Rollers ... Pump Drives ... Winches ... Military Vehicles ... and a host of others.

Fairfield's facilities are unexcelled. Here "under one roof" in a new and ultra modern plant designed especially for the purpose, Fairfield has everything needed for producing all kinds of gears: spur ... herringbone ... spiral bevel ... ground tooth spiral bevel ... straight bevel ... coniflex bevel ... hypoid ... zerol ... worms and worm gears ... splined shafts ... differentials. Get acquainted with Fairfield's engineering and production facilities. Your inquiry will receive prompt attention. FAIRFIELD MANUFACTURING COMPANY, 2319 South Concord Road, Lafayette, Indiana.

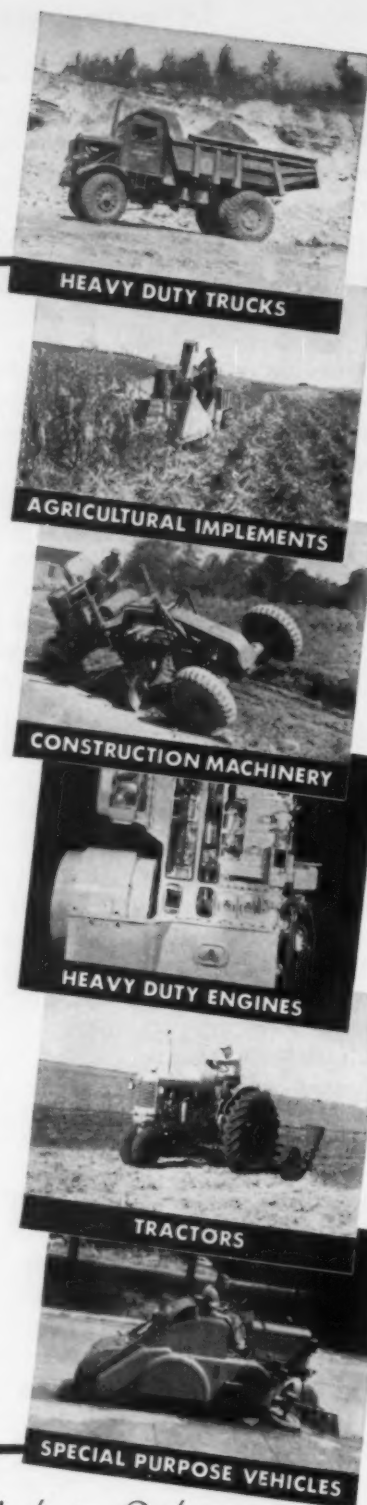
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HEAVY DUTY TRUCKS

AGRICULTURAL IMPLEMENTS

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HEAVY DUTY ENGINES

TRACTORS

SPECIAL PURPOSE VEHICLES

RESEARCH

Steel:

**Allegheny Ludlum brings out
a new type of stainless**

Allegheny Ludlum Steel Corp. announced this week development of a new type of stainless steel that is expected to be particularly useful in the aircraft industry as well as in other fields. Known as Allegheny Metal 350, the new material bridges a gap between existing grades of stainless steels.

A new group of stainless alloys has grown up in the industry which in an initial condition are soft and ductile and can be readily fabricated. These alloys can be hardened by heat treatment at a temperature sufficiently low to prevent excessive scaling and distortion. Allegheny Ludlum's research work in this field has been conducted with these aims in view, but with the added objectives that the steel when hardened will have high impact strength and ductility and good corrosion resistance.

These requirements are said to have been achieved in a new chromium nickel-molybdenum alloy now being marketed by the company. Although the AM 350 alloy can be hardened by elevated temperature treatments, superior properties are obtained by sub-zero treatment.

The new steels will be discussed in a full length technical article which will appear in THE IRON AGE, Dec. 2.

May Sell Atom Power

Possible sale to industry of power generated at the experimental atomic power plant being built at Argonne National Laboratory (near Chicago) is being studied by government and industry experts.

Atomic Energy Commission and Commonwealth Edison Co. are working out ways of disposing of any surplus current, even though it is entirely possible that there won't be any.

The Argonne plant is expected to turn out about 5000 kw. It is to be in operation sometime in 1956. A larger plant being built at Shippingport, Pa., will have a rated capacity of 60,000 kw.

ACCIDENTS: Show How to Prevent Them

Show new safety measures at National Safety Congress . . . Model crane trains workers . . . Steel firm uses flashing lights . . . Foundry fires safety offenders after fourth warning—By K. W. Bennett.

♦ SAFETY engineers still need statistics. Though there's been great progress in the past 2 years, safety engineers agree that the plant safety man needs more figures that will tell the front office what accidents cost—figures that will demonstrate in dollar savings the result of a yearlong accident prevention program, that will tell where most accidents originate, when, and why.

Short on numbers but not ideas, safety men had an overflow of new methods at the National Safety Congress meeting at Chicago last week. A sellout was the demonstration of Inland Steel's model crane for training mill workers and supervisors in crane safety rules. As one steel mill representative pointed out, 20 to 25 pct of mill accidents are connected with some kind of crane.

Use Model Crane

Inland's answer: an electric model crane, standing the height of a man, with a complete control panel and a series of illuminated circuit diagrams that activate as the controls are operated. Agreeing that visual aids are the best training method, Inland electrical department chief L. L. Quinlan produced the device in the company shop and it is now being shown to employees, department by department. At least seven steel companies have evinced interest in the idea.

Representing Canada's Algoma Steel Corp., Rudolph Wheatly suggested the use of flashing lights on cranes halted for repair in an overhead crane installation where several cranes are normally in operation. Algoma with about 100 cranes ranging from 200-tons capacity ladle cranes down to 5-ton carloaders, mounts a flashing neon

light on the idle crane, puts flashers on the floor beneath it plus a safety man with a whistle.

Workers carry a tag which is hung on the main crane switch when the switch is cut to begin repair work. One man gives all orders for the repair party, no one throws the switch until all tags are removed by their owners.

Another tag system, used this time in inspection, calls for tags representing each crane limit switch in a department to be hung in the supervisor's office. Hung with the red side out, the tags are reversed to show a green side when the inspection of each limit switch is completed. This makes it difficult to forget any of these safety devices. Similarly, the use of speaking tubes and two-way radio

in heavy cranes, particularly for close ground control but with increased safety as an added dividend, is on the upturn.

With increasing use of fork lift trucks for cupola loading, the report by Clyde St. John, Kaiser Steel & Aluminum, on facing fork lift trucks with metal shielding and extending the front forks, drew considerable discussion. Though reports from other users of this charging method suggest that truck wear in this case was notably high, Mr. St. John described an 80 pct reduction in "wear and tear" on the trucks when protected by the home-fabricated steel shields. Standard 4,000-lb fork trucks were reworked in the company's own shops.

Foundry safety practices sug-



ONE OF TWO plaques is presented by F. B. Makens, operating superintendent, Joseph T. Ryerson & Son, Inc., Chicago plant, to Stanley Knapp (l) and Robert Smith, building maintenance foreman, in recognition of completion of 10 years without a lost time accident by the plant's building maintenance and machine shop department employees.



Edmont Case No. 562: Unloading tank cars of chemicals and repairing lines, rubber dipped gloves lasted 14 shifts. Edmont Neox (reinforced neoprene) gloves wore 30 shifts and gave better protection.

SAVE HANDS...SAVE MONEY with JOB-FITTED GLOVES



... provide protection up to 10 times longer

In all types of industry, modern job-fitted gloves of coated fabric are replacing canvas, leather and unlined rubber gloves on applications involving sharp, abrasive or slippery materials, or the presence of grease, oil, acids, caustics, solvents or thermal extremes.

Specially developed Edmont coatings of Neox (reinforced neoprene), natural rubber and vinyl plastics, make it possible to fit the glove to specific job conditions to provide maximum protection and employee comfort.

In addition, cost savings to companies or their employees average 40% to 70% through longer wear.

Edmont Case No. 526: Feeding sharp-edged steel into press, leather palm gloves averaged 2 shifts. They were replaced with Edmont plastic palm coated gloves, which lasted 8 shifts.

Edmont Case No. 517: Handling wood laminates and formed plastics, canvas gloves with rubber gloves worn as a liner lasted 3 to 5 shifts. Edmont recommended coated fabric gloves wore 30 to 40 shifts, were more comfortable and gave better protection against sharp edges.

FREE JOB TEST OFFER: Send us a description of your operation, materials handled and temperature condition. From our more than 50 types of gloves — palm coated or fully coated — we will recommend type of glove and coating that best fits your job, and supply free samples for testing. Our laboratory also develops special gloves for special conditions.

Edmont Manufacturing Company, 1234 Walnut St., Coshocton, Ohio

Edmont job-fitted gloves

World's largest maker of industrial coated gloves, available through leading industrial suppliers



gest a sharpening demand that the labor force brush up on its observance of safety rules. One foundry reports giving four warnings to an employee failing to wear his safety glasses and a face shield in the pouring area. First warning is verbal, second is written, third brings a 3-day suspension, and fourth brings a discharge for any worker who needed that many warnings.

Pop Bottle Plans

Workers still don't seem to know what to do with an empty coke bottle. A sample case: the drinker dropped his "empty" into a scrap steel tube. When the tube was being sheared in scrapping; the shear came down, the bottle came out at bullet speed, and a worker received a fairly bad head wound. The company is now using soft drinks dispensed in paper cups.

Another announced grimly that if empty coke bottles didn't start disappearing in the plant, the vending machines would. A third was less drastic, told its soft drink consumers that the vendor would be allowed to bring in as many filled bottles each week as he carried away empties. The inventor of this plan reports that hundreds of bottles came out of hiding and that weekly bottle loss is down to 2 pct.



"I'm going on the wagon first chance I get."

UNEMPLOYMENT: Shows Sharpest Drop

Number of jobseekers dropped 358,000 in October . . . Industrial employment up by 300,000 . . . Agriculture drops 300,000 seasonal workers . . .

Net results indicate even-keel economy with slight gains.

◆ **UNEMPLOYMENT** registered its sharpest drop in 3 years in the first week of October as the number of jobless declined to 2.7 million, 358,000 less than the same week a month earlier.

The job picture, however, is neither as rosy as some politicians imply, nor as distorted as their opponents charge.

While the number of jobseekers dropped 358,000, the number of job holders also dipped, by 3,000. This means simply a lot of workers have left the labor force, and doesn't prove anything, labor leaders say.

This isn't so, argues the Administration—and with some justification. President Eisenhower says he believes it is not a seasonal decline but reflects an upturn in the entire economy. Labor Secretary James P. Mitchell says the drop is caused by the Administration's "Great new program of assuring jobs without war."

Here are the facts:

1. Nonagricultural industrial em-

ployment rose by almost 300,000 workers in the last 30 days, a better than seasonal increase reflecting stepped up auto and steel production.

2. The total available labor force declined by over 400,000 workers.

3. Agriculture employment dropped from 7.5 million in the first week of September to 7.2 million in the first week of October.

4. October employment figure was 202,000 under the number of job holders at the same time last year, and unemployment was 1.4 million higher.

Explanation: The more-than-seasonal rise in nonagriculture employment is significant, reflecting a strong pickup in the economy. The relative stability in employment is seasonal, caused by agriculture workers who normally leave the labor force in the winter instead of hunting for new jobs.

It also indicates that a larger-than-normal amount of students took jobs this summer and left the labor force when classes resumed.

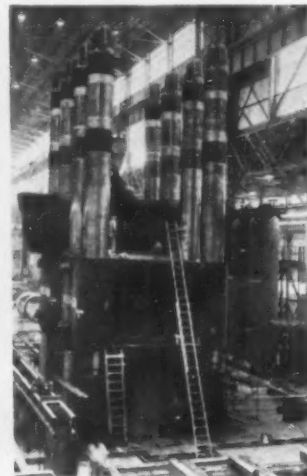
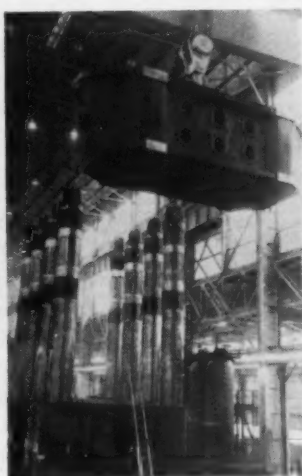
The labor force is expanding as more older workers keep their jobs longer, and the number of younger workers entering the labor market each year increases.

And things are a little slower than they were last year.

The same figures which the Administration gleefully made public a week earlier than usual—before rather than after the elections—indicate some danger spots, however.

A lot of seasonal workers are absorbed during October, November, and December as extra help in the pre-Christmas rush of retail, service and transportation industries. After the holidays, these workers will be released. In addition, the farm workers who withdrew from the labor market this winter will again be out seeking jobs early next spring.

As a result, some experts are privately fearful that unless the business rise continues to gain momentum, unemployment may rise to around 4 million early in the spring of 1955.



INSTALLING the first of the two heaviest components on the 50,000-ton forging press at Aluminum Co. of America's Cleveland Works. It's a 460,000-lb casting which, with its twin, will form the moving crosshead of

the press. Crane lifts the 30.5-ft casting, lowers it over four of the eight columns. The press, along with its "little" 35,000-ton brother, is scheduled to start turning out aircraft parts early in '55.

Contracts:

Navy orders \$700,000,000 worth of aircraft in month.

Army production and procurement awards and Navy contracts with the aircraft industry will, when completely totaled, add up to nearly \$1 billion worth for the month of October.

Almost \$700 million of this amount represents Navy orders. This, says the Navy, will mean October was the biggest single month for contract placements since January 1953.

Three divisions of United Aircraft Corp. received awards aggregating \$193.6 million, while Grumman Aircraft Engineering Corp. signed four contracts amounting to \$164.5 million. Orders for more than \$150 million worth of new F9F-9 fighters were included in the Grumman contracts.

Douglas Aircraft Co. obtained seven Navy contracts with a total value of \$128.8 million. Nearly all

of this sum will be spent for attack aircraft.

Unlike the Navy, the Army did not name specific firms which will share its \$300 million in October contracts. Instead, the Army says merely that about \$200 million worth are for Ordnance and Signal Corps items, including ammunition, trucks, radar mortar locators, and electronic equipment.

Contracts awarded by the other Army technical services are included in the remaining contracts.

Shipbuilding:

Navy lets new contracts on both Coasts.

Navy Dept. has completed negotiations with Bethlehem Steel Co. for construction of two destroyers at the firm's Quincy, Mass., shipyard at a cost of \$32.5 million.

In addition, the Navy has a new contract with Bethlehem-Pacific Coast Steel Corp., which will build two destroyer escort vessels for a fixed price of \$15.4 million.

Bethlehem-Pacific at present is converting an uncompleted Mariner cargo vessel to an attack cargo ship for the Navy and is repairing and overhauling Pacific Fleet ships.

This firm's destroyer escort contract is similar to one newly signed by the Navy with Puget Sound Bridge & Dredging Co., Seattle, which also calls for two of the vessels.

New York Shipbuilding Corp., Camden, N. J., will undertake construction of four new escort vessels with a total value of \$31.9 million. Contract negotiations connected with this procurement have just been completed, although the Navy had disclosed earlier that the Camden firm was in line to get the order.

Other new Navy awards include those made to:

Sperry Gyroscope Co., Great Neck, N. Y., \$1.8 million for gyro compass equipment; Western Electric Co., Whippany, N. J., \$1.3 million for sonar research; Bastian Blessing Co., Grand Haven, Mich., \$233,897 for ice cream manufacturing equipment for shipboard use; Radioplane Co., Van Nuys, Calif., \$172,578 for modifying target drones; Chance Vought Aircraft, Inc., Dallas, \$1.7 million for guided missile test work; and Tredegar, Richmond, Va., \$762,558 for projectile production.

Stockpile Purchases

Results of government stockpile purchases of seven strategic and critical minerals are announced by the General Services Administration.

Chrome—Purchase of 200,000 long tons of ores and concentrates was authorized in 1951, and 70,040 tons have been delivered to date.

Columbium-tantalum—Purchase of 15 million tons has been authorized, and 5,326,144 tons delivered.

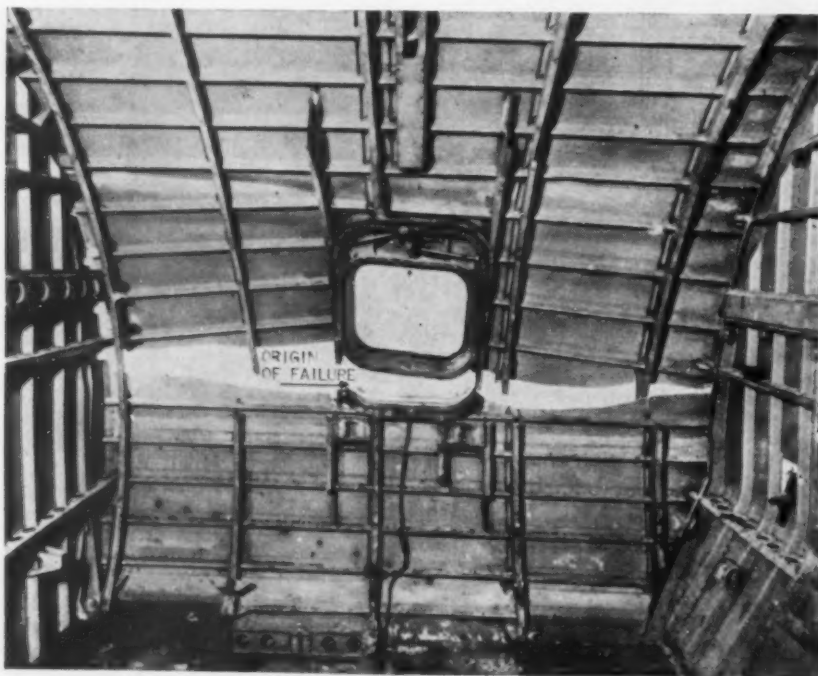
Tungsten—Purchase of 3 million short tons was authorized in 1951, and 1,224,367 tons have been delivered.

Manganese—Purchase of 37 million long tons was authorized in 1951 and 1952. To date, 9,412,988 tons have been delivered.

Mica—Purchase of 25,000 short tons was authorized in 1952, and 4,157 tons have been delivered.

Asbestos—Purchase of 1,500 short tons was authorized in 1952, and 617 tons have been delivered.

Mercury—Purchase of 125,000 flasks (76 lb) was authorized last July, but none have been delivered.



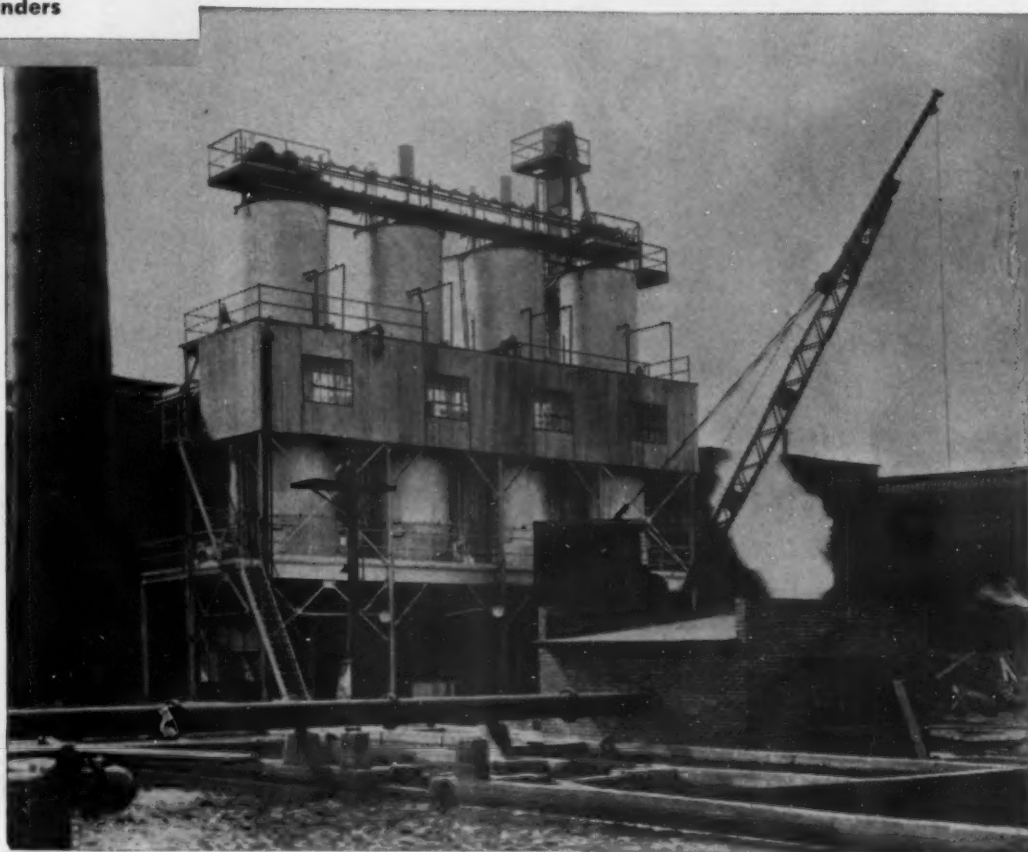
METAL FATIGUE cracked open the cabin of this test Comet in just the way investigators feel sure that it cracked open the bodies of two Comets shortly after their takeoff from Rome early this year (see *The Iron Age*, Oct. 28, p. 43). Photo shows extent of breakage at escape hatch.

Wellman will build it

Charging Machines
Special Cranes
Gas Producer Plants
Forging Manipulators
Car Dumpers
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Ore Bridges
Clamshell Buckets
Locomotive Cranes
Power Cylinders

→ Wellman-Galusha Clean Gas Generators

Built exclusively by Wellman...
for efficient, economical results



Four Wellman-Galusha
Clean Gas Generators
supplying fuel for steel
mill furnaces.

● Only Wellman builds the Galusha Clean Gas Generators that so ideally meet your requirements with efficiency and economy. These generators combine, in a *complete* machine, the rotary grates, ample fuel storage bin, and provisions for generating the steam required for making the gas. Even the lowest-priced grades of Anthracite and coke can be satisfactorily gasified. You can depend on *all* Wellman equipment!

THE WELLMAN ENGINEERING COMPANY

7024 CENTRAL AVENUE

CLEVELAND 4, OHIO

November 4, 1954



UNBRAKO button head socket screws are used exclusively to assemble this controlled volume pump, which was designed to fill the growing industrial need for the pumping of an allotted quantity of liquid at higher pressures, higher capacities.

Save inventory dollars

Use UNBRAKO Standards—stocked by your distributor

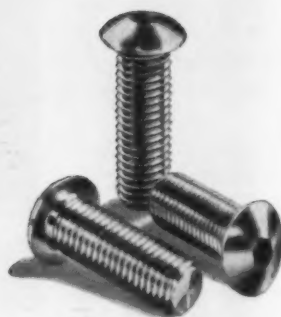
Not only does your UNBRAKO distributor lower inventory investment, he also saves you time—and provides latest information about products, cost-saving methods, production techniques, current problems, trade practices. For latest data on UNBRAKO standard socket screw products, consult him or write STANDARD PRESSED STEEL COMPANY, Jenkintown 17, Pennsylvania.



The assembler inserts the UNBRAKO button head socket screw with his fingers, and runs it down as far as he can.



He then tightens it with a standard UNBRAKO key. Once seated, the low head design of the UNBRAKO button head provides a smooth, streamlined appearance.



UNBRAKO Button Head Socket Screws are made of heat treated alloy steel; have fully formed threads, Class 3 fit; are available in standard sizes from # 8 to 3/8". Accurate hex socket provides nonslip drive, prevents marring or mutilation of the head.



SOCKET SCREW DIVISION



JENKINTOWN PENNSYLVANIA



Self-Locking Set Screw



Flat Head Cap Screw



Shoulder Screw



Dwarf Pin



Knurled Head Cap Screw

Report To Management

You've heard about the current surge of prosperity in Great Britain. Your reaction may be "that's swell, now it won't cost us so much to keep them going."

But there's much more to it than that. This is not just a momentary upswing in a foreign country's economy. The significance is deeper than this. Indications are that Britain is entering a new era—one that will be characterized by a much higher standard of living.

It's too early to pinpoint this trend definitely, but a lot of signs point to it:

(1) Britain's economic pickup—its first since the war—is lasting, widespread and dynamic. It is not a flash in the pan.

(2) A higher percentage of Britain's production is now for home consumption in contrast with the postwar austerity program when as much output as possible was earmarked for export.

(3) As a reaction to the austerity period, from close association with U. S. military forces, and as a natural result of the current boom, the people in Britain are now much more interested in raising their standard of living than ever before.

What this means is that American-style mass production with its higher pay scales, ever expanding output, may be beginning in a big way in the British Isles.

Somewhat the same situation exists in West Germany where the recovery from World War II has been phenomenal. The German rearmament program will take 500,000 workers out of industry and put them in uniform. This means there will be a scarcity of workers, wage rates will go up, and there may be a drop in certain types of production which will result in a decrease in exports.

But it's a safe bet that West Germany is just as capable of piling a defense cycle on top of a strong economy as is the U. S.

Implication of all this to America is that the trend toward mass production and increased consumption in Europe—barring a war but with strong defense business—will mean a higher rate of imports and exports for the U. S. Business will be better all over.

One of the marked peculiarities of the '54 business recession was the way prices held firm at all levels—manufacturing, wholesale and retail. This was an extremely important factor in preventing a serious recession.

In the past when there was an economic slump one of first reactions by business was to cut prices in hopes of reversing the sliding sales trend. But frequently this action only aggravated the problem, causing sales to drop even more as buyers waited for new cuts.

But in the '54 recession business took its lumps in decreased sales volume but wasn't panicked into a wave of price cuts. In January of this year consumer price index stood at 115.2. Latest report places it around 115. Wholesale price index stood at 110.9 in January, it's now around 110.

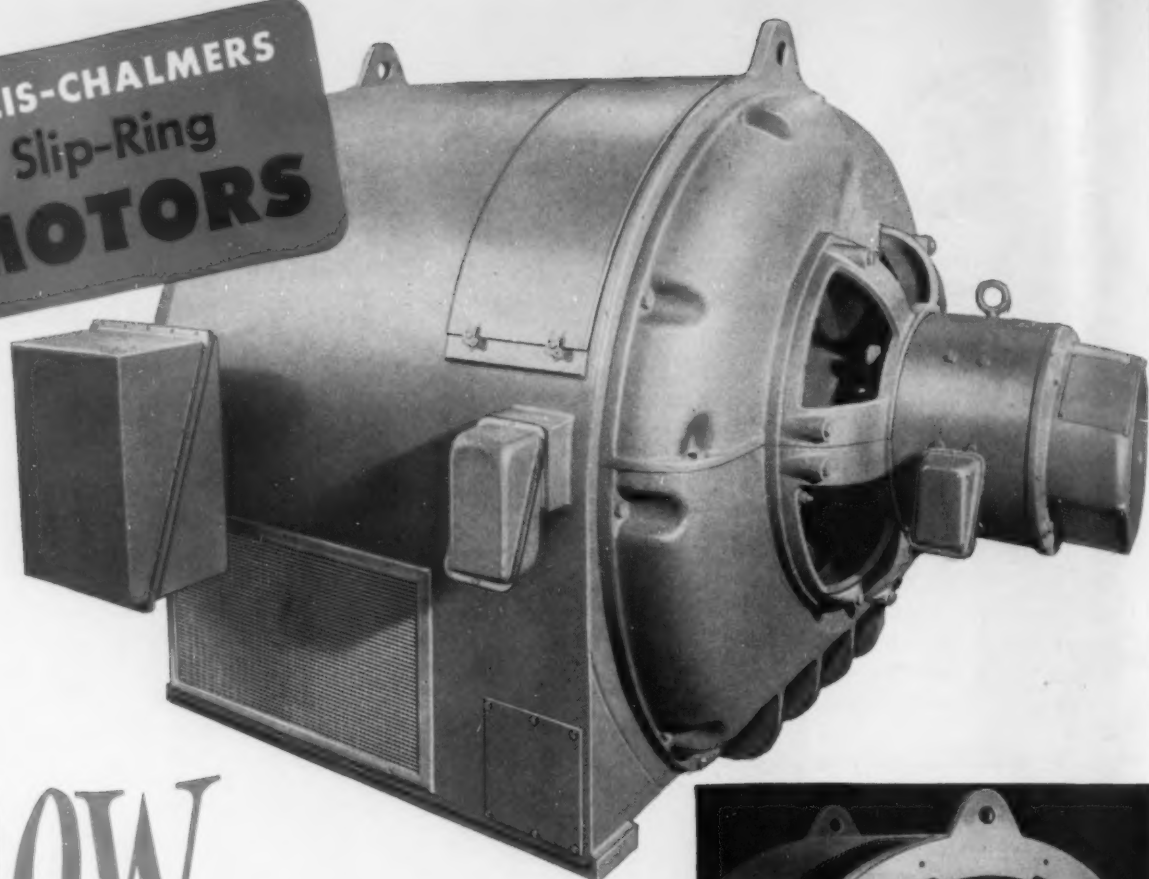
As a businessman you're certainly aware that "times" and tastes are continually changing. But if your business is going very well, it's very easy to forget this fact.

No group is more aware of this factor than the automakers who find their market is continually changing. For example: used to be that only the family on "top of the hill" had more than one car. This is no longer true. In 1948 only 4.8 pct of car owning homes had more than one automobile. This year the figure is around 12.1 pct, indicating a growing market for smaller, low-priced "second" cars.

Last year 7 pct of car owners indicated a preference for hardtops. This year the percentage edged up to 9.1 pct.

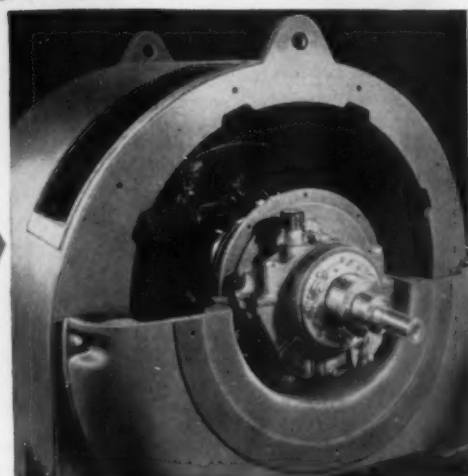
The changes in your industry may not be so violent, but there are changes. Question to ask yourself: Is your company adapting itself to meet these shifts?

ALLIS-CHALMERS
Slip-Ring
MOTORS



new DESIGN...

**more protection with
full accessibility**



* New Allis-Chalmers slip-ring motor with inspection cover and upper half of end shield removed. Note accessibility of brushes, protection of bearing.

ALLIS-CHALMERS LARGE SIZE SYNCHRONOUS AND WOUND-ROTOR MOTORS have been completely redesigned with longer stator yokes and shorter end shields. Collectors and brushes are located inside the yoke for protection against physical damage, dripping moisture, dust and dirt.

Capsule-type bearings give better bearing protection, too. The upper half of the end shield may be removed for inspection or cleaning of the interior of the motor without disturbing the exciter or exposing the bearing to the ravages of dirt, dust and oil contamination.

All leads enclosed — Both primary and secondary winding leads are brought out through separate conduit boxes. There is no loose wiring . . . no exposed leads anywhere.

Easy maintenance — Even though the new design offers maximum protection to brushes and collectors, internal parts are fully accessible for inspection and maintenance through large openings in the stator yoke. Opening covers are readily removed and are secured during operation by easy-operating, self-locking fasteners.

Get details now — This new design is available from approximately 250 hp at 300 rpm and up, in drip-proof and splash-proof construction. Call your Allis-Chalmers representative for complete details or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183.

A-4404

ALLIS-CHALMERS



INDUSTRIAL BRIEFS

Elbow Room . . . Monarch Machine Tool Co.'s Dayton, Ohio, engineering staff has moved into new and larger quarters at 346 Leo St.

Appointed . . . Lindberg Air & Hydraulic Div. has appointed Power Drives, Inc., as its exclusive representative for western New York State.

He'll Advise . . . J. H. McElhinney, vice-president-operations, Wheeling Steel Corp., was appointed a member of an Engineering Council to advise and assist in the development of the Schools of Engineering and Mines at the University of Pittsburgh.

Ohio Office . . . Aero Engineering Div. of Garrett Corp. has established a branch office in Columbus, Ohio, at 85 East Gay St. Walter L. Clark is in charge.

Acquired . . . Blaw-Knox Co., Pittsburgh, acquired all the outstanding capital stock of Tri-Lok Co.

Hear Ye . . . Joseph T. Ryerson & Son, Inc., Chicago, is now manufacturing bar joists for floor and roof construction.

New Arm . . . Crucible Steel Co. of America officially opened its new branch sales office and warehouse last week with a 2-day open house. The new installation is in North Haven in the industrial heart of the Quinnipiac Valley and the center of the branch's four major market areas, Hartford, Bridgeport, Waterbury, and New Haven, Conn.

Dividend . . . Keystone Steel & Wire Co. declared the regular quarterly dividend of 40¢ a share on capital stock payable Dec. 4 to shareholders of record Nov. 12.

Will Expand . . . Thew Shovel Co., Lorain, Ohio, has completed arrangements for purchase of the controlling stock of Dixie Crane & Shovel Co., Inc., Harrisburg, Pa.

Congrats . . . Ex-Cell-O Corp. was judged by a *Financial World* survey of annual reports as having the best annual report of the Machine Tool Industry for the fourth year.

Integrated . . . Houdaille-Hershey Corp.'s North Chicago Div. recently integrated at North Chicago all sales and engineering facilities for its Refrigeration Products Div.

Shares Offered . . . Barium Steel Corp. filed with the Securities & Exchange Commission a registration statement covering a proposed offering of 599,215 shares of the capital stock (par value \$1.00). This stock will be offered to the present shareholders in the ratio of 1 share for every 4 shares now held.

Forging Plant . . . Kaiser Aluminum & Chemical Corp. has acquired a forging plant at Erie, Pa., plans to further expand and diversify its production of aluminum mill products.

Elected . . . Jack C. Malugen was elected president of the Service Tools Institute at its annual meeting at the Blackstone Hotel in Chicago.

Double Capacity . . . Climax Uranium Co. signed a new 5-year contract with the Atomic Energy Commission to double the capacity of its uranium mill at Grand Junction, Colo.

Scholarship Fund . . . Luria Engineering Co. established a university scholarship fund under

which up to \$4000 will be awarded annually to sons of the company's employees seeking higher education.

Warehouse Opened . . . Carpenter Steel Co. held an open house recently commemorating the opening of a new and modern mill-branch warehouse and office in Dayton.

Elected Prexy . . . Anti-Friction Bearing Distributors Assn. elected as its president George Rees, president Syracuse Bearing Co., at its annual meeting in Chicago.

New Moniker . . . U. S. Industries, Inc., is the new name of the former Pressed Steel Car Co., Inc. The company is now widely diversified and the old name had lost its meaning.

Purchased . . . Barber-Colman Co. has purchased the Hendey Machine Co., Torrington, Conn., except for its manufacturing facilities. It will be known as Hendey Machine Div. of Barber-Colman Co.

New Company . . . American Metal Processing, Wakefield, Mass., is a newly formed company and will specialize on functional plating and processing.

An-cor-lox Lock Nuts all purpose LOCK NUTS

makes good equipment better

ALL METAL—Withstand vibration, shock, high temperatures, corrosive conditions.

SELF CONTAINED—No assembling of the lock nut before using.

LOCK TIGHTER—Conditions of vibration improve the locking-power. There is no need to replace An-cor-lox lock nuts after use.

STANDARD BOLTS—An-cor-lox lock nut dimensions conform to standards for plain nuts . . . threads conform to national form.

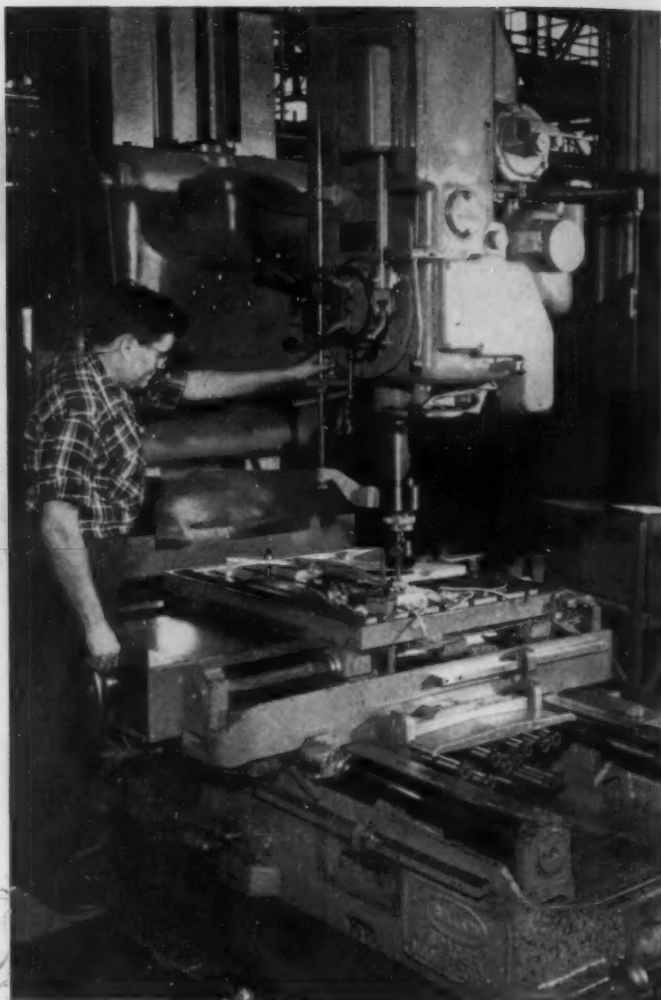
CONVENTIONAL WRENCHES—No special tools are required to apply An-cor-lox lock nuts.

SCREWS ON EASILY—Like an ordinary nut until it is locked in position.

AN-COR-LOX DIVISION

641 PINE STREET ELIZABETH, N. J.

you have
PRECISION
 at your
 finger-tips
 with a
BULLARD
SPACER

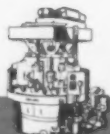


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The Bullard Company
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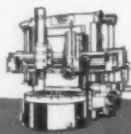
In plant after plant, in many diversified industries, The Bullard Spacer, day after day is convincing management and shop people alike, that where precision counts it is a "natural."

At the San Diego Division of Convair, a machine shop Superintendent says: "We have found the Bullard Spacer very useful in our work. The machine is simple to operate. It eliminates the necessity of zeroing to a set position and there is no chance for error, which is important when you make accurate parts for airplanes."

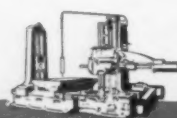
Accurate and precision drilling, reaming or tapping to exacting standards on difficult pieces without the high cost of jigs or fixtures, is maintained with a Bullard Spacer.



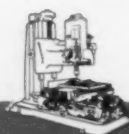
CONTIN-U-MATIC



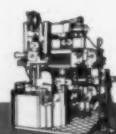
CUT MASTER



HORIZONTAL BORING



SPACING TABLE

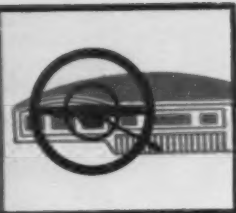


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New Models Spur Production Miracles

Pontiac's 1955 switch to V8 engines took manufacturing sleight-of-hand . . . Old engine production was transferred, V8 tooling set up with only three days lost during whole 2-year job—By R. D. Raddant.

♦ **THE BRILLIANCE** and lustre of the dazzling 1955 models, now appearing at regular intervals through the late autumn, are apt to obscure some of the production miracles that made them possible.

Such a miracle, which the auto industry tends to take in stride, and the customers never hear of, occurred in Pontiac's engine plant. At this General Motors division, the entire tooling for the former straight-eight and six-cylinder engines was replaced by facilities to manufacture the new V-8 with scarcely a day's production loss. It was perhaps the first time in the industry that such a move was made.

Make Advance Plans . . . The necessity of the move was first established back in 1952. Then it was determined that the 180 hp Strato-Streak would be built in the same building that housed current in-line engine production. Its strategic location between the foundry and final car assembly made a completely new building at a different site uneconomic. Secondly, it was a modern plant with adequate floor space.

Decision was made to move the old engine facilities without interrupting production to what is designated as Plant 15. This move was launched on April 27, 1953. In the space of several months, 1000 machines and all the machining and assembly operations were moved to the other plant. Meanwhile V-8 tooling was moved in as rapidly as sections of the plant were rehabilitated.

Production Uninterrupted . . . As a result, Pontiac continued unin-

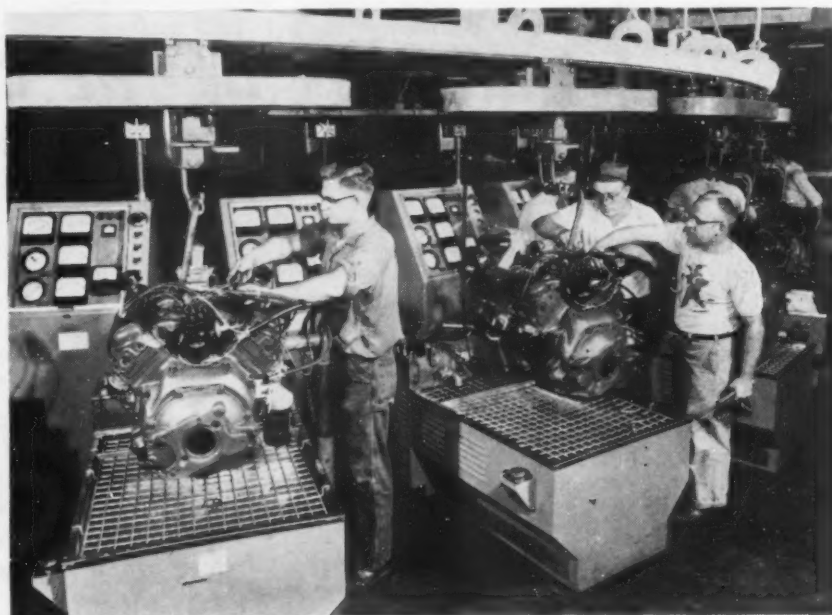
terrupted through its 1953 and 1954 schedules while V-8 engine production for 1955's was set up in time for the present accelerated production rate. Pontiac, determined to lead in the medium-price field, was able to set a record production figure last week because of the long range planning of the move and the skill with which it was carried out.

Job was set up in five major points. First was to move a defense job to another section of the factory. Secondly, automatics had to be transferred. Third, an axle plant that also shared floor space of the engine plant had to be relocated. It wasn't until fourth that the move of the existing motor plant facilities appeared on the

program. As this was started, V-8 facilities were moved in under point 5.

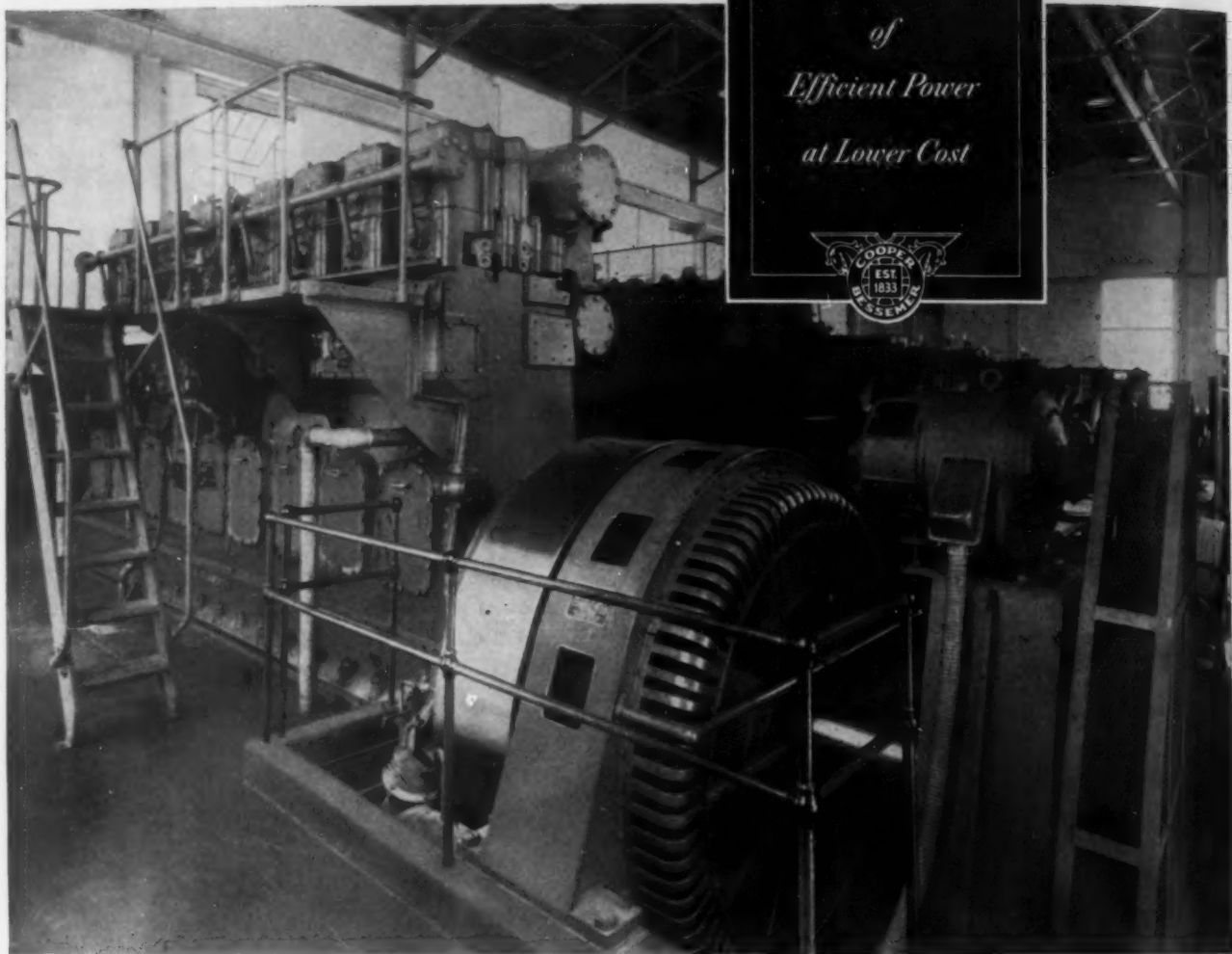
Lost Three Days . . . In the entire move, only three days of production were lost. These were unavoidable, occurred at the outset when final engine assembly was transferred as the initial move. Assembly was shut down and started up again in the new location at the end of the third day. From that time on, the production schedule of 85 eights and 30 sixes a day continued without faltering until the last 1954 cars were turned out a month or so ago.

After moving assembly, with its multitude of fixtures and conveyors, the movement was a compara-



ENGINE TESTING at Pontiac's new V8 plant is done on giant merry-go-round test stands that are synchronized to move at same speeds as the overhead conveyors which bring engines from assembly department. Thus engines are tested continuously without leaving the conveyor.

Interior of Hearne's municipal power plant with latest 1715 hp Cooper-Bessemer supercharged Gas-Diesel in foreground. City Manager N. L. McCarver reports that engine's fuel and lube cost averages .00252 mills per kwh.



*Another Example
of
Efficient Power
at Lower Cost*



BIGGEST TAXPAYER IN THE CITY OF HEARNE **Cooper-Bessemer Gas-Diesel Power!**

TO the 4,778 citizens of Hearne, Texas, modern Gas-Diesel power has been a real boon indeed. Not only does their municipal power plant produce 64% of the city's total revenue, but it is largely responsible for low property taxes, a 92-acre municipal park, a golf course, fully equipped club house and a big swimming pool with bath house, to say nothing of street lighting, free school service and other contributory services.

Hearne's base generating load is carried by two Cooper-Bessemer Gas-Diesels — 1000 hp and 1,715 hp units installed in 1947 and 1950 respectively. Fueled mostly by gas, these modern, exceptionally efficient engines last year operated at a fuel cost of only \$0.002755 per kwh compared with \$0.00465 for older type oil burning engines in 1946.

Says City Manager N. L. McCarver, "We made a good investment in our Cooper-Bessemer. They are not over-rated and will pull their load without the least bit of trouble. The new turbocharged engine is now down for annual check-up and is the cleanest engine we ever saw."



New York Washington, D.C. Bradford, Pa. San Francisco Houston,
Dallas, Greggton, Pampa and Odessa, Texas Seattle Shreveport
St Louis Los Angeles Chicago Cooper-Bessemer of Canada, Ltd.,
Halifax, Nova Scotia Tulsa Gloucester, Mass. New Orleans, La.

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Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 30, 1954.....	69,803*	19,057*
Oct. 23, 1954.....	48,289	14,087
Oct. 31, 1953.....	129,775	15,536
Oct. 24, 1953.....	129,765	20,029

*Estimated. Source: Ward's Reports

tively simple matter. It was done by the system of building up a backlog for an operation, then moving it before the backlog was exhausted. Most moves were broken down to three or four days, but were continuous.

Move By Sections ... As a section was cleared of machinery, it was cleaned and rehabilitated. Foundations and other facilities for whatever V-8 operation was to be located there were immediately installed. The preparation work was considered as vital as the move itself. The axle plant move was started in January, 1953 and first V-8 tooling was moved in on July 1. Tooling up for the V-8 under these circumstances took about a year. Pontiac had completed its pilot production and test runs and a sizeable production of V-8's was scheduled for August.

The move was so well planned that production of in-line engines was actually improved in its temporary setting in Plant 15, even though it was to last only a brief year before giving way to the V-8.

Merger:

Reorganize American Motors' operating divisions.

American Motors, which a few months ago was a shapeless mass of manufacturing and marketing facilities, is beginning to take shape as an integrated company.

Last week George Romney, the company's youthful president, outlined a divisional setup that appeared to make sense. He will directly head the automotive division, which will embrace production and marketing of Hudson and Nash automobiles.

Three new operating units, each to be autonomous manufacturing and marketing divisions, will be Appliance, Export and Subsidiaries, and Special Products divisions. The functions of each

are apparent from their names.

Other major steps in integrating American's operations include: Amalgamation of Nash-Kelvinator and Hudson resources into an organization with more than \$400 million in assets. Consolidation of Nash and Hudson styling, body building and final assembly. Integration of manufacture of Nash and Hudson on a common tooling basis which is expected to cut from \$15 million to \$18 million in costs the first year of operation. Elimination of duplication of warehousing.

Option Power Boosts

This column was among many that meticulously observed off-the-record mention at GM press previews of "power packages" that will be offered on Pontiac and Chevrolet.

In case anyone hasn't read it by now, since there appears to be a double standard in this instance, here is what they amount to: To supplement the regular Chevrolet V-8's 162 hp, a package consisting of dual exhausts and 4-barrel carburetor will provide an optional 180 hp. In Pontiac,

AUTOMOTIVE NEWS

the 180 hp of its new V-8 will be increased to 200.

Chevrolet engineers were a little bit irritated by the result of their package. Most of the gain came from the inexpensive dual exhaust, comparatively little from the more expensive multiple carburetion.

Continuing on horsepower, Ford's Thunderbird will have 198 hp when equipped with Fordomatic transmission. Cadillac is reported to be raising the ante to 260, as is Chrysler, but Packard is slated to beat them all.

GM Cuts Freight

Following Ford's virtual elimination of "phantom freight" last week, General Motors, as predicted, followed along. While actual figures are not yet available, the corporation will increase its prices slightly on all lines, but reduce distribution charges on vehicles delivered to dealers more than 1200 miles from base plants.

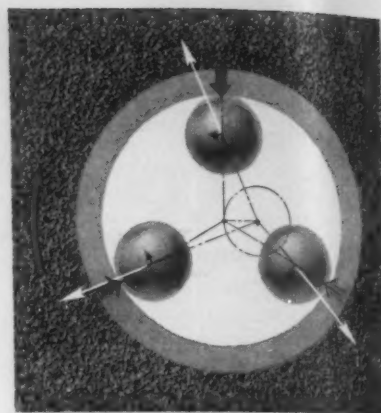
THE BULL OF THE WOODS

By J. R. Williams



AUTOMATIC GRINDING WHEEL BALANCING

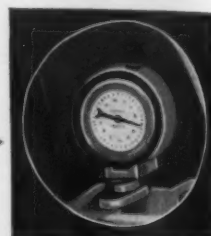
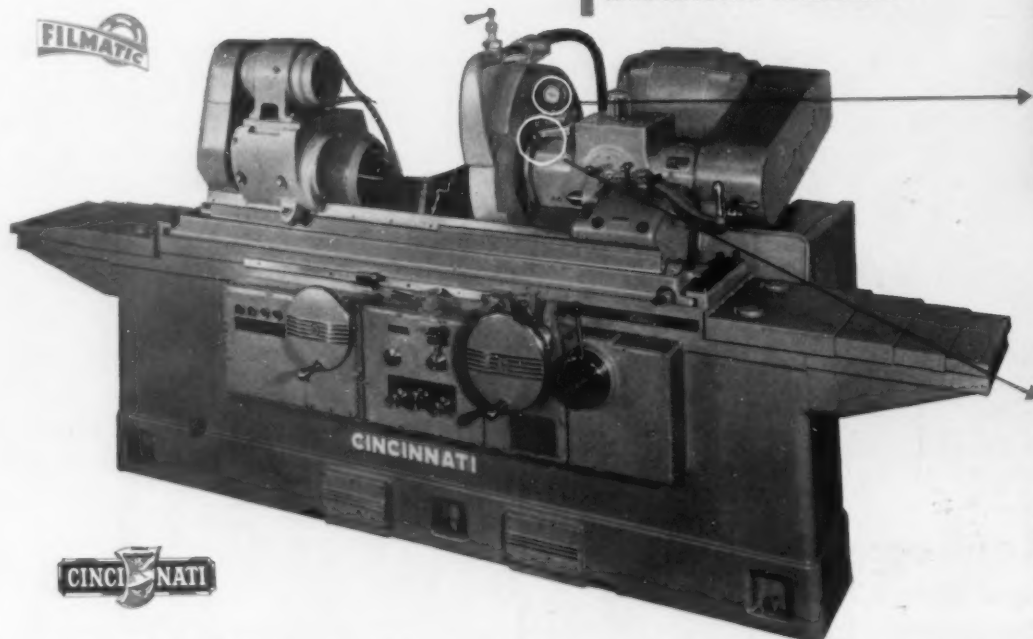
**Now Standard Equipment
on Cincinnati Filmatic**



Here's how it works. Three steel balls are carried in a raceway in the wheel end of the spindle. As the spindle rotates, the balls are free to move and correct any unbalanced condition that may exist. Then they are clamped in position.

6", 10" L,
10" and 14" L

**PLAIN
HYDRAULIC GRINDERS**



An indicator needle tells the operator when the system is balanced.



This lever clamps and unclamps the balls in their raceway. Anyone can perfectly balance the grinding wheel . . . in a few seconds' time.

This exclusive Cincinnati feature automatically balances the grinding wheel in a few seconds with the spindle rotating at its operating speed.

Eliminates vibration and resultant chatter . . . permits more effective stock removal; produces superior finish; reduces wheel cost per workpiece.

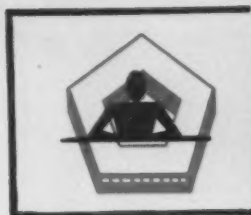
Automatic balancing of grinding wheels climaxes years of Cincinnati research in adapting a fundamental principle of balancing to the needs of precision grinding machines. ¶ Under ordinary shop conditions, using conventional static balancing equipment, even skilled operators will seldom balance the grinding wheels so that a precision balance is obtained. At normal operating speeds the slightest degree of unbalance produces an uneven cutting action. Although not always visible to the eye, this results in a variation of sparking. Cincinnati automatic balancing system is ten times as accurate as conven-

tional static balancing. ¶ Together with trouble-free FILMATIC spindle bearings, automatic balancing of grinding wheels assures smooth, even cutting to closer dimensional accuracy, superior finishes and higher production at a lower cost. ¶ Complete information may be obtained by writing for publication No. G-637-1.

**CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO**

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THIS WEEK
IN
WASHINGTON

Economists See Stable Metal Prices

Copper may edge up but steel and other major metals are expected to remain pretty much at present levels . . . Shooting war would change outlook but one isn't in the cards—By G. H. Baker.

♦ **PRICES** of steel and most metals will stay just about where they are now, the government's top economic experts believe. Copper may edge up a bit, but no sharp rises or drops are anticipated for other key industrial commodities.

Lead and zinc will jog along at about present levels, it is predicted. A high level of output with resulting good supplies will prevent any sharp climbs, and government stockpiling will act as a prop against any sagging of prices. This is also true of rubber and other stockpiled materials.

Industrial purchasing agents will not have to worry too much over price fluctuations in the months ahead. Aside from some minor ups and downs, they can plan safely on the basis of normal factory needs. There's no indication that industrial prices will blow hot and cold, thus forcing alternate periods of heavy buying with periods of no buying.

War, of course, would cancel this outlook completely, but shooting war involving the U. S. is not in sight.

Missiles Make Markets . . . Government buying of guided missiles is shaping up as a strong, long-run defense procurement item. If your firm is equipped to produce big-scale military weapons and is in the market for government contracts, forget such highly-specialized items as the atomic cannon and go after contracts or subcontracts growing out of production of the new flying robots.

Missiles now in production which probably will be bought in greater numbers in the year ahead: the Corporal (a guided missile), Honest John (a free rocket), and the Redstone (a long-range guided missile).

Procurement of atomic cannon has been quietly dropped. It's estimated that the Army had bought around 50 atomic cannon in the last several years, but has finally concluded that missiles and robots are superior weapons—both as to support of ground troops and the defense of cities.

Merger Wave Ends . . . The wave of business mergers of recent months is about over, if government antitrust lawyers have anything to say about it. Federal Trade Commission's new "speedy but thorough" probe of mergers and acquisitions is no mere window dressing. Both FTC Chairman Edward F. Howrey and Assistant Attorney General (for Antitrust) Stanley N. Barnes are

determined to slow the trend down to a walk.

This means that many of the 200-plus mergers now being studied by the FTC are to be stymied. In some cases, the government may even order merged companies to "unmerge," to revert to their pre-merger status.

Most of this group of 200-odd cases are in the primary metals, automobile, chemical, or textiles industries. Sharp rise in the number of business mergers in the past few years is indicated by these figures:

1949-137	1952-822
1950-200	1953-793
1951-703	1954 (first half)-295


Among the prominent proposed mergers of 1954 is the Bethlehem-Youngstown Sheet & Tube case which was vetoed by the Justice Dept. on grounds that it would result in less, not more, competition. Justice Dept. officials have made it clear that they will sue promptly to block the merger if Bethlehem and Youngstown should decide to proceed with the proposed merger.

Ease Price Law . . . Federal Trade Commission will veer away from requiring expensive "mechanical" defenses in favor of a "rule of reason" approach in dealing with price discrimination cases.

FTC Chairman Edward F. Howrey issues the announcement in a special concurring opinion in the Commission's recent dismissal of a complaint against Sylvania Electric Products, Inc.

Chairman Howrey says that the





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Today's jets soaring higher, faster, and farther are a tribute to the imagination and resourcefulness of the aviation industry. American Welding is proud to have contributed to this effort as a supplier of rings, bands and welded assemblies for every major U. S. aircraft engine manufacturer. In many instances, American Welding furnishes these completely finished — welding, machining and assembly all having been done in our plant. Our various divisions working closely with customers have developed new techniques and methods to keep pace with progress in the industry.

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cost-justification proviso of the Robinson-Patman Act, which permits price differentials that make allowance for cost differences, means that the price cuts must be "reasonably related" to costs.

Switch Back . . . For many years, the Commission used the "rule of reason" in dealing with price discrimination cases, but then changed to require expensive cost accounting proof that the differentials between a manufacturer's price to various customers was justified on the basis of lower costs because of large orders.

The Commission should return to "first principles" in administering the Act, Mr. Howrey says, and carry out the congressional intent to "make a fair adjustment between the protection of small buyers" and "to preserve for the consumer the benefits of mass production and low cost distribution."

A special committee consisting entirely of accountants, has been studying the cost proviso of the Act, but has not come up with definite recommendations.

Nickel:

Freeport Sulphur to study new process.

Freeport Sulphur Co. will research a new process for production in this country of nickel and cobalt from Cuban ore.

This work is to be done under an agreement between Freeport and General Services Administration. Government funds, up to a maximum of \$6.25 million, will be provided for construction of pilot plant near New Orleans on land bought by Freeport.

The company will supply, free of charge, 50 tons per day of ore from the Moa Bay area of Cuba. There will be no fee for the research operation.

Contingent on construction of a commercial plant by Nicaro Nickel Co., a Freeport subsidiary, the government will make good a new commitment to buy as much as 150 million lb of nickel and 15 million lb of cobalt at prevailing market

prices by the end of June 1963.

Nicaró would use private funds to finance building of the commercial plant, with part of the facilities to be established near the Moa Bay deposits. Annual production goal would be 30 million lb of nickel metal and 3 million lb of cobalt metal.

NLRB:

Republicans, Democrats split in jurisdiction.

Republican and Democratic members of the National Labor Relations Board split over the first cases involving a majority decision to regulate labor disputes only for the larger firms.

In its first ruling under a policy announced last spring, NLRB refused to take jurisdiction over labor troubles involving six small companies. New policy sets higher dollar limits on the volume of business a firm must do before coming within Board jurisdiction.

Republican members say the new standards exempt from Federal regulation no more than 1 pct of the total number of workers sub-

WASHINGTON NEWS

ject to the "broadest reach of the Board's legal jurisdiction." Democratic members objected that it is closer to 25 to 33 pct.

Democratic members also objected that the cut in jurisdiction amounts to a "usurpation of legislative power by an administrative agency" because it turns over jurisdiction in these cases to the states—one of the issues which caused a hot partisan fight in Congress last year when the Taft-Hartley Act was up for amendment.

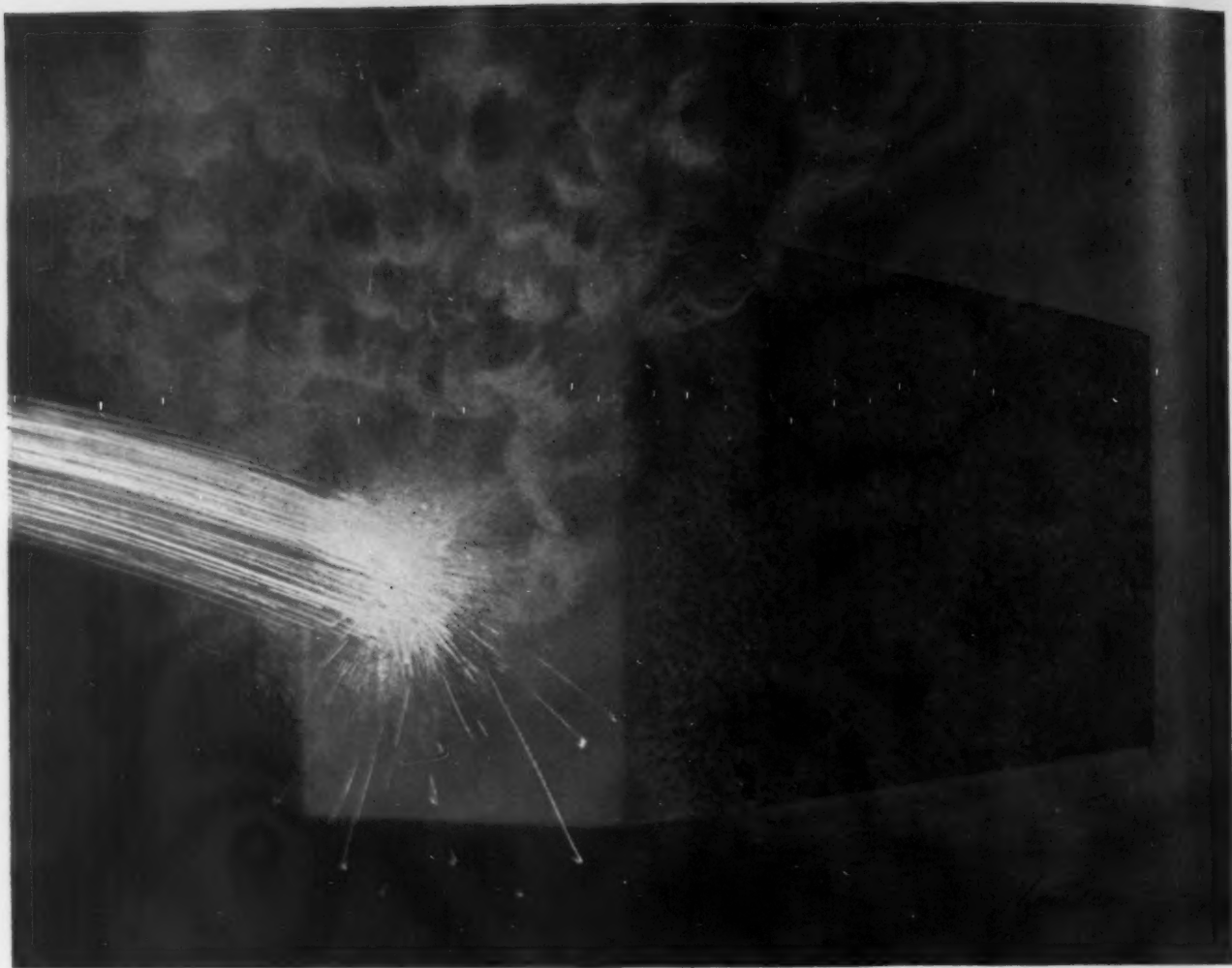
Has No Bearing

The Republican majority insists that "a desire to establish broader state jurisdiction" had no bearing in the decision to curtail the Board's activities, although they concede that it will be one result.

Cases on which jurisdiction was refused were an intrastate trucker; a rice drying cooperative, two supermarkets, an office building; a gas utility company, and a franchised automobile dealer.



ETHAN M. PENDLETON, American Brass vice-president, is sworn in as Director of BDSA Copper Div. by Administrator Charles F. Honeywell.



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with Permanente Periclase-Chrome A Brick

THE SPECIAL COMPOSITION of Permanente Periclase-Chrome A Brick has greatly increased end wall life in open hearth furnaces of leading steel producers—often with thinner walls at lower cost!

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1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance, thus preventing end wall buckling.
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4. MgO content is higher than in other end wall brick.
5. In addition to the special composition, the brick's maximum density minimizes alteration by resisting gases and impurities.

Let your Kaiser Chemical sales engineer show you how you can get longer life from your end walls with Permanente Periclase-Chrome A Brick. Wall thickness may often be greatly reduced with this superior brick, or end wall life may be extended, depending on the needs of your operation.

Call or write any of the sales offices listed below for immediate attention to your particular problem.

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New Gains For Prestressed Concrete

Construction method got its start during Korean War steel pinch
... Cuts steel usage by 80 pct, costs up to 30 pct ... Today, much-improved
techniques, solid savings bring greater usage—By R. R. Kay.

♦ **PRESTRESSED CONCRETE**, steel-saving technique which gained impetus during the Korean War steel shortage, is enjoying a boom on the West Coast.

Although early jobs were sparked more by steel savings than by cost cuts, techniques have improved so much in the past three years that it's claimed this method has slashed as much as 30 pct in some building costs.

Savings Considerable . . . Reports of steel savings are impressive. Design for prestressed concrete calls for roughly one-fifth the amount of steel a reinforced concrete structure requires—one-twelfth, if designed for structural steel. More savings come from need for less concrete, elimination of steel placing and tying, and prefabrication of many beams away from the project site.

Projects completed or under way on the West Coast replace about 2500 tons of structural steel, T. Y. Lin, Assoc. Prof. of Civil Engineering, University of California, Berkeley, told THE IRON AGE in an exclusive interview.

Build Large Structures . . . In the San Francisco Bay Area, three freeway bridges and two big garage buildings—one a 10-story affair—have been built, or are being constructed, of prestressed concrete.

A \$3-million contract has been let to Duncanson-Harrelson Co., and Pacific Bridge Co., San Francisco, for the 1500-ft prestressed concrete Richardson Bay Bridge. Use of prestressed concrete piles for the proposed Southern Cross-

ing of San Francisco Bay is being considered.

Mr. Lin, who recently returned from a Fulbright-sponsored study of European developments in prestressed concrete, estimates West Coast prestressing projects have consumed something like 500 tons of high strength steel wire. He says the Richardson and Southern Crossing bridges alone will require 500 tons more.

Greater Usage . . . Los Angeles has about 25 prestressed-concrete structures completed or now going up. Many more are on the drawing boards. Two floating dry docks were built by this technique in San Diego.

The steel industry, says Mr. Lin, isn't in love with prestressing because of the sharp cut in amount of steel used. But he points out West Coast projects using the method have multiplied tenfold annually. He predicts this rate will slow down, but he still sees "a continuous, rapid growth."

Let Aircraft Contracts . . . It's official now. West Coast airframe manufacturers have \$469.3 million in new contracts:

Boeing Airplane Co., \$306 mil-

lion for B-52 heavy jet bombers, spare parts and tools, at Seattle and Wichita, Kan.;

Douglas Aircraft Company, Inc., \$128 million for B-66 and RB-66 twin-jet light bombers and reconnaissance bombers, at Long Beach, Calif., and Tulsa, Okla.;

Lockheed Aircraft Corp., Burbank, Calif., \$30 million for C-130 turbo-prop transport aircraft, at Marietta, Ga.;

Convair Div. of General Dynamics Corp., San Diego, Calif., \$2.8 million for spare parts, etc.

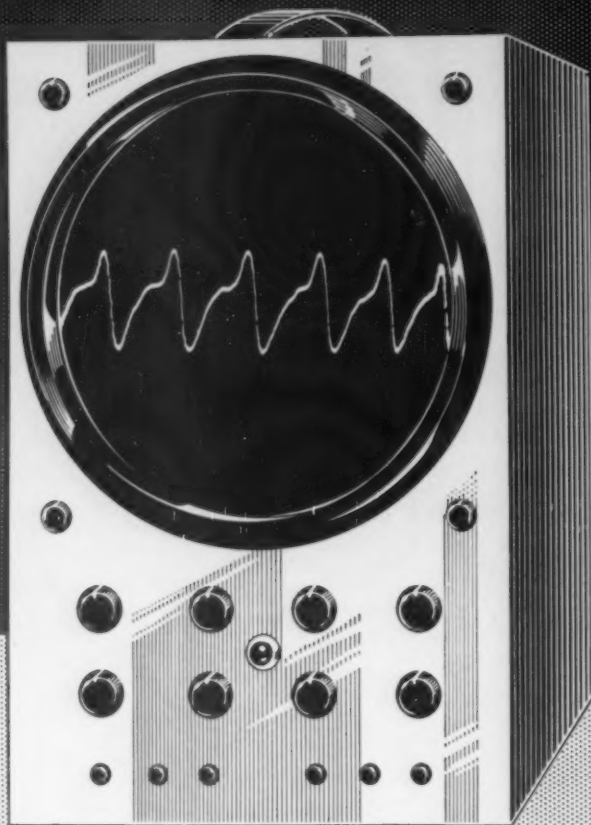
North American Aviation, Inc., Los Angeles, \$2.5 million for needed facilities in F-100 Super-Sabre fighter program.

New reports of Soviet Russia's increased air might should help U. S. proponents of larger Air Force appropriations.

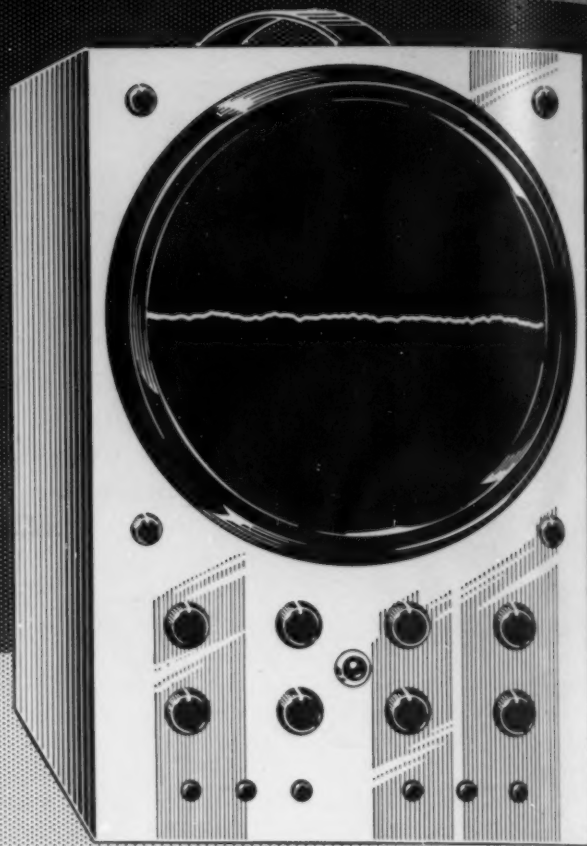
Shipyards Get Business . . . Private western shipbuilding and repair yards, anemic from lack of work, got another transfusion: a \$15.4 million shot in the arm for Bethlehem Pacific Coast Steel Corp., San Francisco. An order to build two Navy destroyer escorts follows closely on a similar order to Puget Sound Bridge & Dredging Co., Seattle.

Bethlehem's contract marks the first major combat-vessel construction in a private San Francisco shipyard for several years. It comes at a good time, for the yard is finishing up the last Mariner-class vessel for Pacific Far East Lines. About 1600 workers will shift from the Mariner work to the Navy contract. Work is scheduled to begin after the first of the year.





WHEN A STRAIGHT MINERAL OIL was used to lubricate the ways, an 0.0008" jump at frequency of 2.74 cycles per second was noted.



WHEN SUNOCO WAY LUBRICANT was used on the ways, the jump was too small to measure, proof that this medium stops slip-stick motion.

TEST PROVES SUNOCO WAY LUBRICANT ENDS SLIP-STICK TABLE MOTION

How effectively Sunoco Way Lubricant stops slip-stick table motion is graphically illustrated by these oscillograms. The pattern on the left was made with a straight mineral oil as the lubricant; the other was made with Sunoco Way Lubricant on the ways. Both patterns are magnifications of changes in rate of table travel

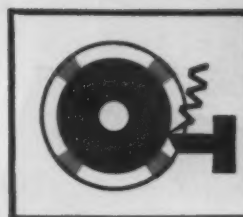
and were obtained under identical conditions.

You can stop slip-stick table motion, protect the ways, get better surface finishes, cut production losses with Sunoco Way Lubricant. Try it in your shop. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-11.

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MACHINE
TOOL
HIGH SPOTS

Shipments, Orders Up in September

Machine tool order backlog at 3 to 4 months as new order index gains 31.9 points over August . . . Shipment index eases up to 213.6 for September . . . Fear new U. S. surplus sales—By E. J. Egan, Jr.

♦ **NEW ORDERS** for U. S. machine tools increased in September as they did in August, carrying the industry to a fairly safe distance from the recent midsummer slump. Builders are using every sales stratagem they can think of to solidify this trend for the future. At the same time they're trying to hold the lid on mounting pressure in Washington to lease or sell quantities of government-owned machine tools.

National Machine Tool Builders' Assn. estimates the new order index for September at 179.8, compared with 147.9 in August and 124.7 in July. Dollarwise, September new business will come to about \$53 million. Next to June, when business was supposedly

boosted by fiscal year end orders from Washington, September is the best month for the year to date.

Ship More, Too . . . The NMTBA shipment index also improved slightly in September, hitting a scale mark of 213.6. Same index in August rated 203.7, while in July the figure was 205.7. Tools are being manufactured and shipped promptly for the most part. A healthy sign is that the machinery is going to a broad segment of the metalworking industry now that automotive tooling programs for 1955 models are complete.

Backlog for the machine tool builders is pegged at something between 3 and 4 months although orders on hand at individual plants will vary widely from this figure.

Defense Mobilizer Arthur Fleming says confidently that the Defense Dept. is almost ready to begin buying tools with funds from the \$100 million Congress voted for that purpose. He states that procurement officers who will do the actual buying for the military will get the green light "within a few weeks."

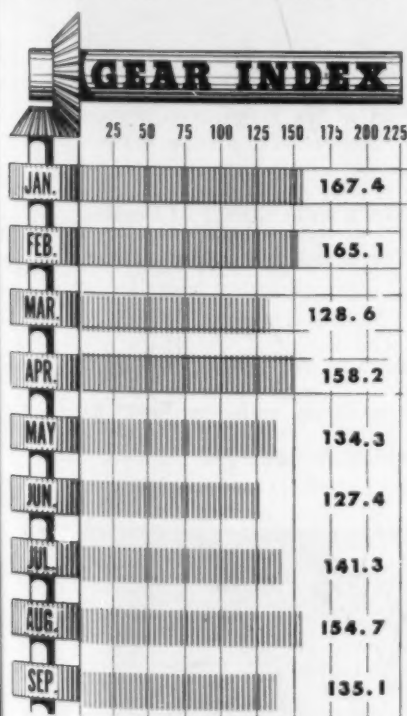
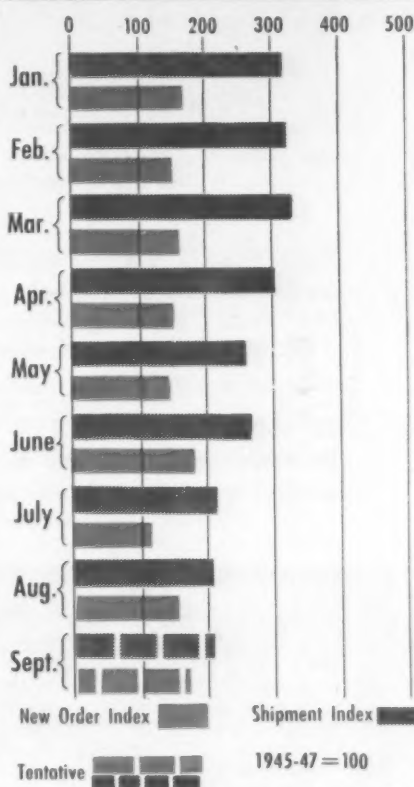
Fear Surplus Sale . . . But even as builders look to new weapons and basic preparedness programs for orders, they fear increasing pressure on the Pentagon and the Office of Defense Mobilization to lease or auction off more of the government's machine tool hoard.

Title to Uncle Sam's World War II and Korean war production equipment does not rest with any one government department. The armed services own the bulk of it,

but a number of other Federal agencies carry impressive inventories of their own. ODM is supposed to have the final say about what happens to these tools, and issued a directive a year ago to make this clear.

Requests and demands to lease or buy so-called government surplus tools keep pouring in to ODM officials. It takes time to investigate these queries. Some of the proposed end uses make sense from a defense preparedness point of view; others are flagrantly out of the question.

MACHINE TOOLS, 1954



Source: American Gear Manufacturers Assn.

Source: NMTBA

**An
Example**

OF MASS PRODUCTION METAL-WORKING MACHINERY By Waterbury Farrel



This group of "WATERBURY" Solid Die Double Stroke Headers is in operation at the Blake and Johnson Company, Waterville, Connecticut. Production rate per machine approximately 150 headed blanks per minute.

Waterbury Farrel is a recognized leader in the production of cold process bolt and nut machinery.

Yet, this is only one of several broad classifications of metal-working machinery which have spread Waterbury Farrel's reputation throughout the world. As can be seen below, the company's century of design, engineering and production

experience also includes a wide variety of Presses, Mill Machinery, Wire Making Equipment and Special Machinery.

For high speed, economical production of a vast range of metal products, industry looks to equipment by Waterbury Farrel.

WF-6

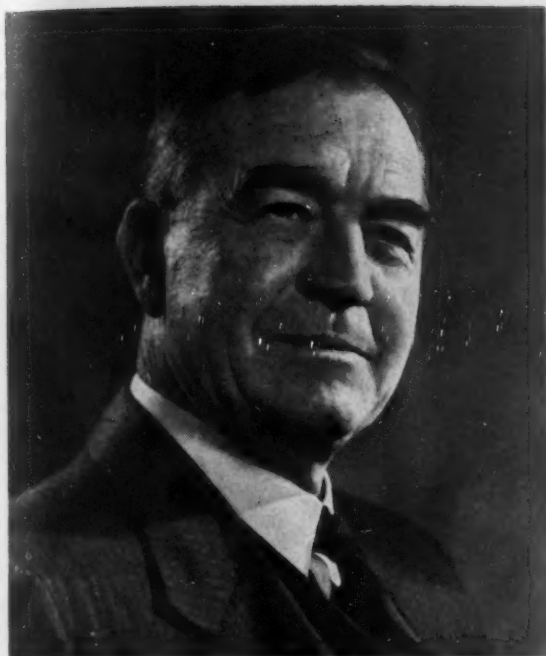
WATERBURY-FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY-FARREL • COLD PROCESS BOLT AND NUT MACHINERY—Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Slotters • Nut Toppers, etc. POWER PRESSES—Crank, Cam and Toggle; also Rock and Pinion Presses • Multiple Plunger Presses • Hydraulic Presses, etc. MILL MACHINERY—Rolling Mills • Wire Flattening Mills • Chain Draw Benches • Slitters and various accessory mill machinery. WIRE MILL EQUIPMENT—Continuous Fine Wire Drawing Machines (Upright Cone and Tandem) • Bull Blocks • String-up Machines • Spoolers, etc.

FOUNDED
WATERBURY FARREL

1851



The Iron Age

SALUTES

Roy H. Davis An ex-naval officer from Oregon who turned to steelmaking, his visits to Canada convinced him of the country's great industrial future. For 26 years he's been a leader in making that potential a reality.

You don't have to wear a coonskin cap and carry a Kentucky rifle to be a pioneer. Particularly if you are Roy H. Davis, president of Atlas Steels, Ltd. of Canada.

Roy first became aware of the undeveloped industrial potential of Canada over 30 years ago, when, as general manager of Firth, Sterling Steel Co., Pittsburgh, he travelled through the Dominion on business trips. His enthusiasm for the pioneering possibilities in Canada grew with each visit and he resolved to build his future there.

In 1928 Roy found the opportunity he needed in a small, tool and special steel plant, Canadian Atlas Steels, at Welland, Ontario. He moved to Canada for good—became a citizen in 1935.

After much planning, negotiating and money-raising, Atlas Steels, Ltd. came into being on June 1, 1928 with Roy at the helm.

Raising the funds necessary for the expansion he knew was warranted was a task demanding all of Roy Davis' faith and abilities. As he told

one prospect who wanted to see the Atlas plant before investing: "You wouldn't see anything except some old buildings and machinery. I'm not asking you to invest in them—I'm asking you to invest in what the company can become."

The wisdom of those who bet on Roy's vision, energy and ability has been well rewarded over the past 26 years—profit at the end of Atlas Steel's first year was a little over \$50,000.

Resting on past laurels has no place in Roy Davis' or Atlas Steels' scheme of things. The pioneering habit is too strong. In 1950 the company became Canada's first producer of stainless steel sheet, followed by stainless steel strip and tubes in 1954. Recent installation of a Rossi-Junghans continuous casting machine at Welland typifies Roy's desire to keep Atlas expanding and improving.

A native of Oregon, Roy graduated from Annapolis in 1909, spent 4 years as a naval officer before he resigned to enter the metalworking industry.

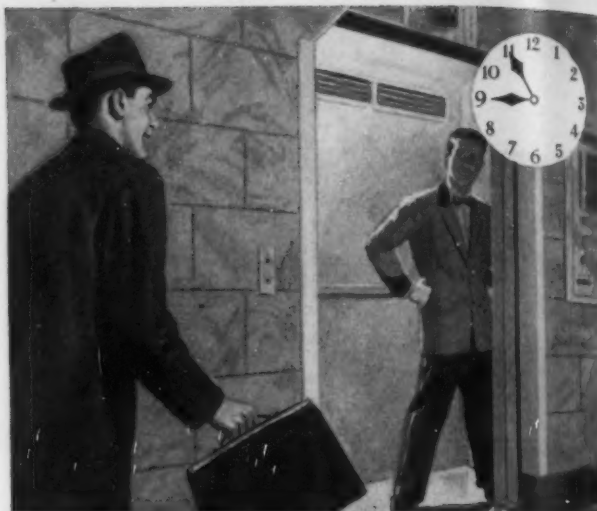
November 4, 1954

105

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'round the clock with CF&I-WICKWIRE WIRE

In this advertisement we continue to take you through a typical day in the life of John Q. Citizen...showing you the part CF&I-Wickwire Wire plays in his everyday activities.



OFFICE BUILDING—8:55 A.M. John never stops to think about it but he rides up to work on dependable elevator cable. Without this indispensable wire product—much of it made of CF&I-Wickwire Wire—modern multi-story buildings would be unable to function.



OFFICE—9:00 A.M. Here we are, inside John's office. Where is the wire? All around us. Paper clips inside the desks. Springs inside the telephones and the typewriters—even under John's swivel chair. Staples, coat hangers, ring binders—these and countless other office necessities are made from wire—very often of CF&I-Wickwire Wire.



FACTORY—3:00 P.M. Let's accompany John on a trip to his firm's nearby factory. The premises are inclosed by a wire fence. Inside, we find wire mesh cloth used as machinery guards. Metal processing belts made of woven wire. Springs of every variety to keep the machines going. All of these products use CF&I-Wickwire Wire.

Watch for the balance of John's day in our next advertisement which takes John back to his home and the relaxation of his living room.

For the Wire You Require—Check CF&I-Wickwire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

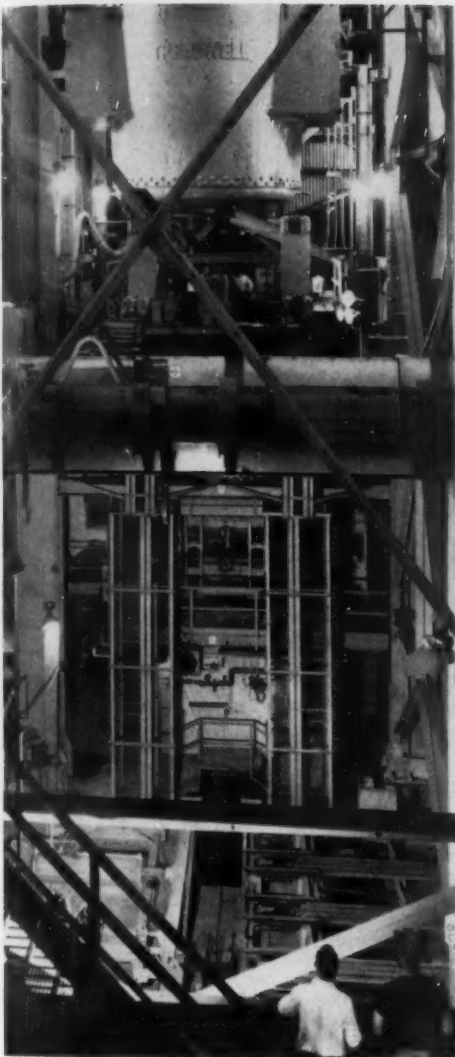


WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston
Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Wichita

2692

Advanced ideas—

Modern Steel Plant Teams Continuous Casting With Planetary Mill



◆ Some of the most modern equipment ever designed for steel production has been installed at Atlas Steels, Ltd., in Canada . . . Main feature in the plant is a commercial continuous casting machine for stainless and specialty steels . . . Other advanced equipment includes a planetary hot mill, a continuous high-head heating furnace and an automatic powder scarfing unit for conditioning stainless steel billets.

E. C. Beaudet Technical Editor

◆ AN IMPRESSIVE array of modern steelmaking equipment installed at the Welland, Ont., plant of Atlas Steels, Ltd., may well provide the ideas from which the steel mill of the future may be drawn.

Among the most advanced equipment now in operation are a commercial continuous casting machine for stainless and specialty steels, a Sendzimir planetary hot strip mill, a continuous high-head heating furnace and an automatic powder scarfing units for conditioning stainless steel billets.

A willingness to gamble on new ideas, confidence in Canadian growth and the necessity for

expanding product lines with the least amount of investment were major factors behind the management's decision to install this revolutionary equipment.

Before World War II Atlas capacity more than met Canadian demand for tool steels, mining, drill and specialty steels. And it exported them to 59 countries abroad.

War's end saw production facilities multiplied 5 to 7 times, the export market at a low ebb and an economic readjustment underway at home (the Canadian boom had not started). Faced with these uncertainties the management decided to overhaul war-gearred production facili-

"Savings will also come from a higher percentage of yield from molten to semifinished steel . . ."

ties, place heavy reliance on the domestic market and manufacture a product the country needed and which Atlas was well qualified to produce.

R. H. Davis, Atlas president, felt the stainless sheet and strip field offered the most promise. The company had made stainless billets, rod and

wire for many years and Canadian per capita consumption of stainless sheet and strip was low compared to the potential market that existed. In 1949 a decision was made to install a hot-rolled sheet mill while at the same time a vigorous campaign was started to stimulate demand for stainless sheet and strip products.

With these beginnings the company undertook a \$12 million expansion program which is now nearly completed. In addition to the equipment mentioned above, the Atlas expansion program has brought Canada its first continuous stainless steel strip and tube mill.

Continuous Casting

The most dramatic installation at the plant is the continuous casting machine. Built and designed by Koppers Co. under Continuous Metal-cast patents, the unit stands four stories high, weighs 75 tons. So far it has cast $5\frac{1}{2} \times 7\frac{1}{2}$ in. billets and $5\frac{1}{2} \times 21\frac{1}{2}$ in. slabs although it can accommodate any size billet within the range of 4 x 4 in. and 6 x 24 in. Most experience has been in the production of the 300 and 400 series of stainless steels. However, the company plans to use it for tool steels, valve steels and other specialty items.

Steelmen from all over the world are closely watching the development of continuous casting in Canada. While it has been done successfully for over a decade in the nonferrous industry, its cost-saving possibilities have for the most part eluded steelmakers. Reasons for its faster development in the casting of brass, copper and aluminum are the smaller-sized melts and slower

casting rates needed for economical operation.

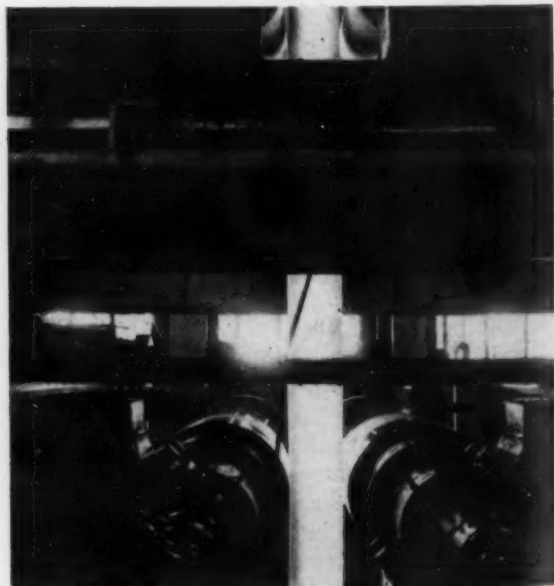
Fundamentally steel is no more difficult to cast continuously than nonferrous metals once the proper relationship between mold lubrication, casting speeds and cooling rates have been determined. Main stumbling block so far has been inability of casting machines to keep pace with the output of melting units.

This problem assumes greater importance when casting carbon steels produced in open-hearth furnaces having capacities in the 275 ton range. It is not as critical at Atlas since it is a specialty mill producing alloy and tool steels in smaller quantities. For the most economical operation however, the casting machine should consume the contents of the melting furnace in one cast without the necessity of holding furnaces or other expensive auxiliary equipment.

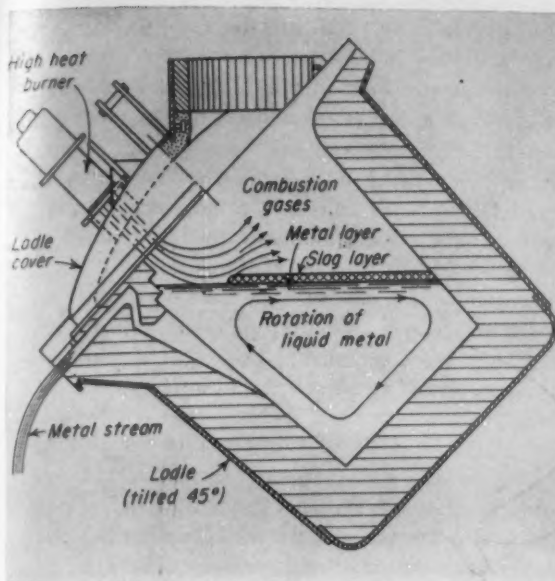
Despite these difficulties, the potential economies of continuous casting have long fascinated



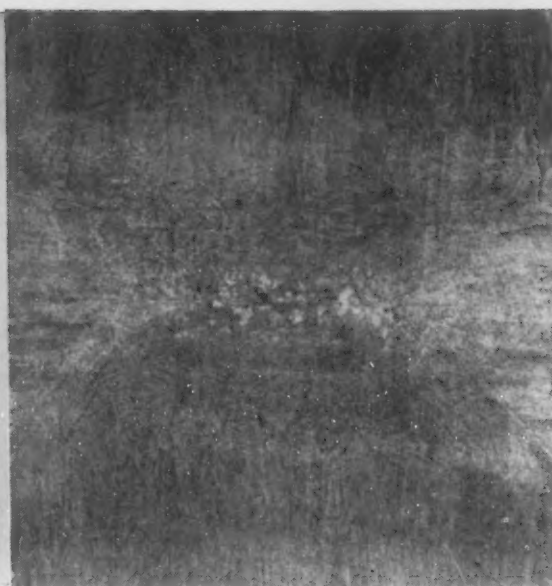
MOLTEN METAL is poured from special 35-ton ladle held in an automatic tilting cradle. Under-pouring prevents slag from entering mold.



TWO FLOORS below casting area, pinch rolls withdraw casting and form it to slab dimensions. From pouring to withdrawal takes about 20 sec.



HIGH VELOCITY burner provides stirring action when ladle is tilted. Stirring improves homogeneity, holds back slag.



CROSS-SECTION of type 304 stainless casting shows clean, homogeneous structure. Casting rate was 36 ipm, but higher rates are possible.

steel engineers. The ability to go from molten steel directly to a semi-finished section is of no small consequence in these days of high equipment costs and breakeven points. Continuous casting would eliminate the need for all ingot casting and stripping equipment, soaking pits and blooming mills which are the largest and most expensive units in conventional steel plants.

An important saving will come from a higher percentage of yield from molten metal to semi-finished steel. Recovery of good material at Atlas averages anywhere from 90 to 95 pct and in some

instances recovery has been as high as 97 pct.

This saving is particularly attractive in the production of high priced items such as alloy and tool steels as compared with carbon steels.

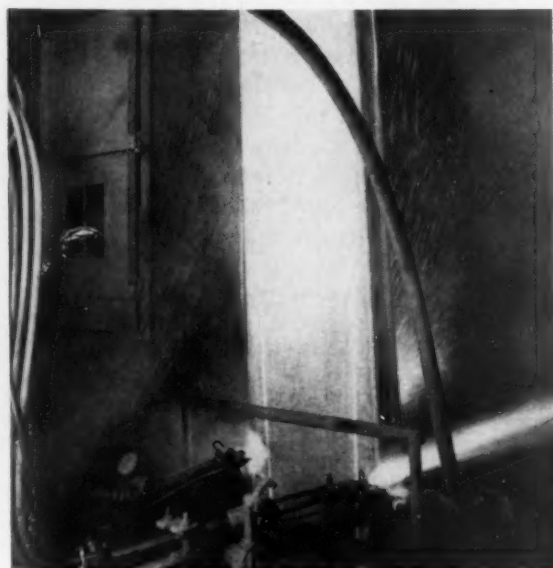
The continuous casting machine at Atlas is of the same general design as other Rossi-Junghans units now in operation. Major refinements have come in the control and coordination of metal temperatures, pouring speeds, cooling methods, withdrawal rates and cutoff operations.

Molten steel is available from six Heroult-type electric furnaces ranging from 5 to 50 tons.

At the start of casting operation, molten metal is poured into a special 35-ton ladle lined with fire and insulating brick and preheated to 2400°F. The slag dam and spout, designed for underpouring, prevent slag from flowing into the tundish. The charged ladle is transported to an automatic tilting cradle on the 31-ft high casting floor.

A high velocity oil burner, attached to the ladle cover close to the pouring spout, creates a stirring action in the metal when the ladle is tipped for pouring. This stirring action improves metal homogeneity and holds back the slag from the spout.

The ability of the high heat burner to keep the melt at temperature eliminates the need for a holding furnace and other auxiliary equipment. To keep heat loss at a minimum the burner has to achieve nearly perfect combustion. From the time the metal is poured into the ladle until casting starts, the temperature of the steel doesn't drop more than 100°F. A further drop of only 60°F takes place during the entire pouring period which takes about 35 minutes for an average-sized heat.



DUAL-TORCH SETUP automatically clamps to casting and cuts it to desired length as it moves downward. Note cleanliness of slab surface.

"Oscillating the mold improves surface finish and prevents metal from sticking to the walls . . ."

At the start of the cast, the steel temperature is from 2750° to 2825°F depending on the grade. The metal fluidity, solidus and thermal conductivity of the steel all influence this temperature. The pouring temperature is kept as low as possible for each grade.

The tundish, which is also preheated to 2400°F for 1½ to 2 hr, differs slightly from previous designs in that it is divided into two chambers. The back chamber receives the turbulent metal and a dam holds back any slag or gangue which might happen to flow into it. The second chamber contains the refractory downspout through which the molten metal drops into the mold. The flow of metal through these chambers and dams greatly reduces turbulence and delivers a slag-free, precisely positioned vertical stream to the mold directly below. A steady flow rate from the tundish to the mold is obtained by holding constant the head of the metal in the tundish.

Open-bottom mold heart of unit

To prevent oxides from forming on the metal surface in the mold, a propane atmosphere is placed on the top of the tundish, around the ladle spout and around the molten stream beneath the tundish and over metal in the mold.

The open-bottom mold is the heart of the continuous casting unit. It is of solid copper, 6 in. thick and chrome plated on the cavity walls for greater wear resistance. Cooling coils in the interior of the mold carry water at the rate of 175 gpm. Weight of the molds varies from 1100 to 3000 lb depending on the section being cast.

A common feature of all Rossi-Junghans units is the oscillating mold which moves ¾ in. downward at the same speed as the casting but returns about three times as fast. Oscillating the mold improves surface finish and prevents metal from sticking to the walls. It also hastens heat removal since a new section of wall is constantly being brought into contact with the casting. Most contact occurs in the top 3.5 in. of the mold where a steel shell of ⅛ to ½ in. thickness is formed.

Mold only 20 in. long

One of the most important features of the mold is its short length of 20 in. This has contributed much to the success of the operation. The mold walls exert a cooling action on the metal mainly in the top 2 to 4 in., the casting shrinks from the mold cavity and the rate of heat transfer and solidification fall off sharply, below this point. Therefore it is desirable to draw the metal out of mold and subject it to the cooling action of the water sprays below as fast as possible.

A vegetable oil, fed into the mold during casting, provides lubrication between the mold wall and the newly formed billet. Most of the lubricant burns as a carbon deposit on the mold wall.

While the mold may be the heart of the operation, the cooling area from the bottom of the mold to the pinch rolls is the most critical. It is here that the steel is made good or ruined. If breakout occurs it will usually take place within 2 in. below the mold. Excessive cooling at any point may cause cracking, breaking, deformation and rupture of the shell. Lack of sufficient cooling may result in remelting.

Spray pattern can be changed

The cooling chamber directly below the mold contains the roller apron and the spray system. The roller apron consists of a number of small rolls placed one above the other. These help to form the casting, guide it to the pinch rolls and work water from the sprays against the steel. The faster the casting rate the longer the roller apron should be. The 9-ft roller apron now used at Atlas can handle up to 50 tons per hour.

The sprays, fitted with replaceable nozzle tips to change the spray pattern, are interspersed between the rolls. Spray pressures are very important. Higher pressures and smaller spray nozzles are desirable for fast cooling action and to break the steam blanket and prevent it from acting as an insulator. A range of 50 to 75 psi is preferred.

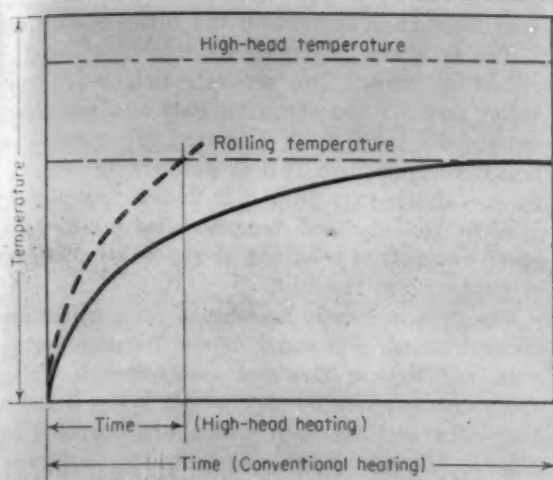
The pressure, amount and pattern of sprays used depends upon the type of steel being cast. An average of 225 gpm are used on the 5½ x 21½ in. slab for the 300 series stainless grades while about 50 gpm are used for tool steels.

Two sets of pinch rolls below the cooling area withdraw the casting and do some forming. At the start of casting a dummy bar is threaded through the pinch rolls to the bottom of the mold. The pinch rolls pull the dummy bar and the subsequent casting through the machine. Time from start of pouring to start of withdrawal at the pinch rolls is about 20 seconds.

The solid casting enters the cutting chamber up to 1700°F where it is cut into lengths by two oxyacetylene torches. The torches are mounted on a carriage which moves vertically downward with the casting during cutoff. The cutoff and discharge is on an automatic cycle. When the cut is completed the torch carriage and torches return to their starting position. The casting falls away and is lowered into a discharge pit on a bracket.

Full production in early '55

Although continuous casting at Atlas is still in the development stage, the results of this first commercial machine on the continent will be watched with great interest. Most effort to date has been put into determining the proper conditions for casting various stainless and alloy steels. However, the company does expect to



TIME-TEMPERATURE CHART shows how high thermal head shortens heating time for rolling.

have the unit in full production early next year.

Casting rates to date have been conservative. On $5\frac{1}{2} \times 7\frac{1}{2}$ in. billets, rates have reached as high as 75 ipm while $5\frac{1}{2} \times 21\frac{1}{2}$ in. slabs have

"Hi-Head" Heating

Atlas' new stainless strip and tube mill has a monthly capacity of 500 tons of cold finished strip and 130,000 ft of tubing. Cost of this equipment to date is \$7.5 million. Of particular interest in this mill are the continuous hot strip line and the annealing and pickling line.

Major units in the hot strip line are a continuous slab heating furnace and a Sendzimir planetary hot mill.

Slabs for the strip mill are heated in a continuous "Hi-Head" furnace which mechanically resembles a roller-hearth type furnace. This furnace, designed and built by R-S Furnace Corp., operates on the principle of a high temperature differential between the heating chambers and the slabs. The heating chambers are

been cast at 40 ipm. The higher the thermal conductivity of the steel cast, the faster the casting rate can be. It is expected that $5\frac{1}{2} \times 7\frac{1}{2}$ in. billets can be cast at 100 ipm as greater experience is gained. While the maximum heat size now handled is 35 tons, the designers state it is possible to go to 100 tons with the present type of equipment.

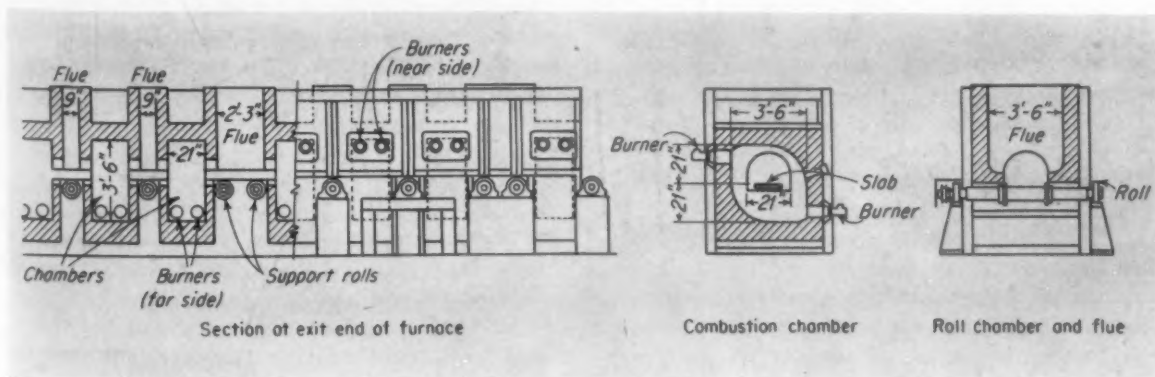
The surface and internal quality of the continuous cast steels are said to be comparable to conventionally processed materials. The steel is clean, free of slag inclusions. It has a high degree of internal soundness. Segregation is held to a minimum because of the rapid cooling and solidification of the metal.

A line of weakness which develops at the center of a rectangular casting (or a point of weakness in the case of a square), can be overcome by proper spraying methods or can be cured in rolling as long as no oxygen gets into the metal. There is a possibility of breaking the crystalline structure and final center solidification by mechanical means or by a cooling technique.

fairly small and circular in cross-section, making the furnace well suited for continuous handling of slabs regardless of their length.

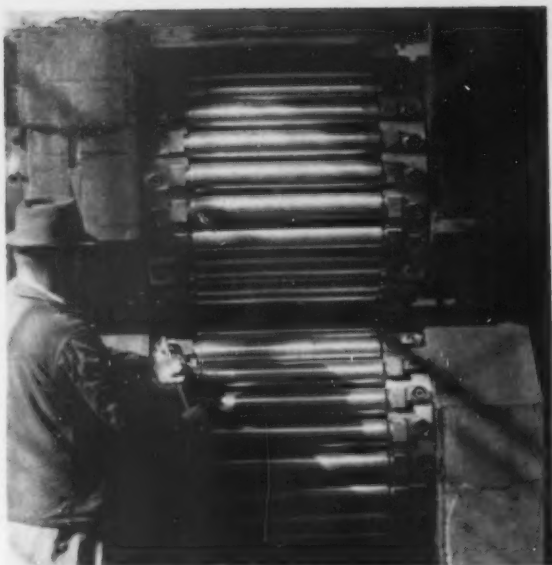
As the slabs move through the furnace on power-driven rollers, they are completely surrounded by a high velocity band of hot gases which transfer heat to the slabs by both convection and radiation. Oil burners fire tangentially into the circular heating chamber between the chamber wall and the slab. At no time do the flames impinge on the slabs as they pass through the furnace.

Several factors entered into the selection of this type of furnace. First, because the high thermal head provides faster heating, the furnace is well suited for a volume production setup.



FURNACE SECTIONS show principal elements in high-head heating. High velocity flames in

combustion chamber heat slabs rapidly, inhibiting scale formation, improving strength.



SENDZIMIR HOT MILL takes 2¼ in. thick slabs and reduces them to 0.100 in. in one pass. Here worker adjusts bearing of planetary rolls.

Rapid heating also drastically reduces scale formation.

Another important feature is uniform heat conduction to the interior of the slab. As a result, working qualities of the metal are better and less rolling effort is required.

The furnace has a normal production rate of 25 tons of stainless steel slabs per hr. The slabs have a maximum thickness of 2¼ in. and a maximum width of 20 in. Slab lengths of 7 ft 6 in. and greater are heated to a temperature of 2250°F as they pass through the furnace end to end in single file. Floor space occupied by the furnace, exclusive of blowers and control panels, is 8 ft wide by 74¼ ft long.

Except at the slab guide locations, rolls which convey the slabs through the furnace are mounted between the heating chambers and spaced on 42 in. centers. They are made of centrifugally cast heat resisting alloy tube having a 7 in. outside diameter and a 1¼ in. wall thickness. Their base width is 23 in. Machined necks of SAE 1340 steel inserted at each end are carried by anti-friction bearings.

Each roll is water cooled by an axial supply pipe. With water supplied at a pressure of 30 psi, roll surface temperature is maintained

below 1800°F. Simple flanges on the rolls prevent slabs from contacting the furnace walls.

The rolls are driven by roller chains through reduction gears. Two separate drives are provided, one for the charging half and the other for the discharge half. Forward roll speeds can be varied from 0 to 11.5 ft per minute whereas reverse speeds vary from 0. to 29.2 ft per minute. Due to the elevated temperatures used, high speed reversal is required in the event of delay or shutdown at the mill.

The furnace has 20 heating sections which are divided among five zones. Zone 1, the entering zone, and zone 2 have five sections each which are normally operated at 2700°F. Zones 3 and 4 have four sections each which are operated at 2650°F. Zone 5 operates at rolling temperature.

Each heating section is fired by four oil burners, two on each side of the furnace. Burners on the drive side of the furnace fire above the slab while those on the opposite side fire below the slab. Spent gases vent from the heating sections into vertical flues above the work rolls and are exhausted to the atmosphere.

The 20 burners in Zone 1, made by Thermal Research & Engineering Co., are of the high release type. The remaining 60 burners are velocity burners made by North American Mfg. Co. Both types are operated with No. 3 oil which is supplied to the high release type burners at a pressure of 400 psi and to the velocity burners at 60 psi. The burners are capable of developing a total of 120 million Btu per hr.

The furnace proper is a steel casing lined with Babcock & Wilcox Kaocast material. This inner lining is backed with 2600° insulating refractory brick. Because of this relatively small amount of refractory and the high fuel input, individual heating sections are at their normal operating temperatures within 30 minutes after lighting off from a cold start. When the fuel is shut off, the temperatures will drop from 2700° to 1900° in 3 to 4 minutes.

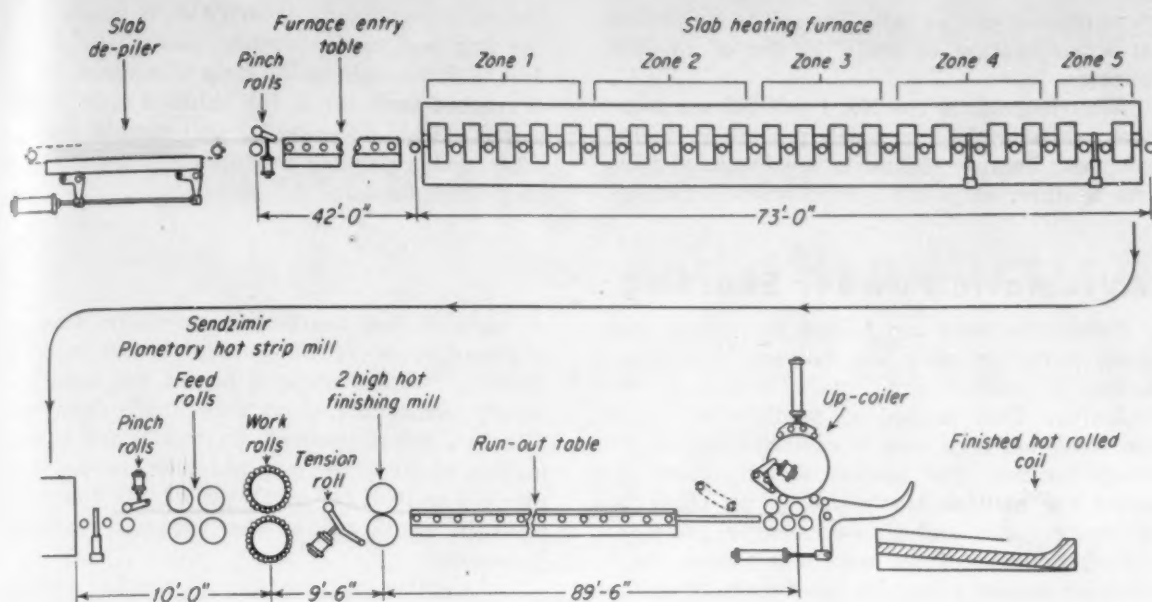
If the hearth area of this furnace is considered to be the product of the width between roll flanges and the distance between centers of the end rolls, the hearth area would be 152 sq ft. At a normal output of 25 tons per hr, the output would be about 30 lb per sq ft of hearth area. This compares with an output of 50 to 75 lb per sq ft of hearth area for a conventional furnace used on stainless steel.

Planetary Mill

Like the continuous casting machine, the Sendzimir planetary hot strip mill has certain advantages for the smaller steel producer because of its low cost and ability to economically roll smaller tonnages. Entirely different from the Sendzimir cold mill, the hot mill may prove to be the Armzen Co.'s most outstanding development.

The mill at Atlas takes 2¼ in. thick, 20 in. wide stainless steel slabs and reduces them to 0.100 in. in one pass.

This mill with its one pass style of hot rolling and high speed heating furnaces, subjects the slabs to conditions wherein scaling in the furnace is extremely light and secondary scale formation is at a minimum. This affords the possibilities



HOT STRIP LINE shown is one of main components in \$7.5 million stainless strip and tube

mill. Hot mill output is 24 tons per hour. Widths now being rolled are 18.0 to 18.5 in.

of producing excellent surface finish in rolling.

Widths now being rolled are 18 to 18.5 in. Maximum rolling width is 20 in. which includes allowance for edge trimming. The mill is small, compact and fits well into the scope of steel processing, since it is in tandem with the rest of the hot strip line. It was built by John Bertram & Sons, Ltd.

Entire reduction in one pass

In the hot mill a number of work rolls are used in one stand, several passes are tied into one major pass and the entire reduction is made in this single major pass and in one direction without reversing.

For one-pass reduction small work rolls are equally spaced around the periphery of a pair of back up rolls. Two planetary assemblies—one top and one bottom—are carried in a set of mill housings in two-high fashion. Cages, one at each end of the body of each backing roll, hold the work rolls in position. The cages and work rolls are free to rotate about the center of the backup rolls. However, they are geared together for alignment and synchronization of work rolls on top and bottom.

Slabs from the heating furnace must be forced into the rolls because of the large roll bite angle and method of mounting of the work rolls. This is done with two sets of feed rolls mounted in the same housing as the planetary rolls.

Two sets of feed rolls, driven by a 35-hp motor to each set, take a total reduction of approximately $\frac{5}{16}$ in. to push the slab through the planetary rolls continuously and insure butting the slab end to end. The feed rolls, $17\frac{3}{4}$ in. diam x 28 in. face width, have a normal speed range from 0 to 8.8 fpm. The first set can be

speeded up to 17.6 ft per minute to close any gap between slabs.

Reduction is made by 48 small diameter work rolls ($3\frac{5}{8}$ in. diam x $24\frac{1}{8}$ in. face width) equally spaced around the circumferences of the two back up rolls driven by a 1250-hp motor. The back up rolls (27 in. diam x 24 in. face width) are driven in the direction of strip travel by a synchronous motor at 297.5 rpm.

The heavy reduction on the slab made by the planetary rolls increases the metal speed during the roll bite from the typical entry speed of 6 ft per minute to a strip speed of about 100 ft per minute. The mill is normally rated at 24 tons per hour on stainless steels. Strip from the hot mill passes to a two-high finishing mill driven by a 250-hp motor.

In addition to the low installation and operating costs the planetary hot mill makes possible the rolling of brittle materials without fracture and tough materials with ease.

Annealing and Pickling

The annealing and pickling line at Atlas was designed with considerable flexibility to permit the processing and cleaning of all grades of hot and cold rolled stainless strip. The line, installed by Wean Engineering Co., can simultaneously handle two strands of strip from 0.007 to 0.187 in. thick by 10 to 20 in. wide at speeds from 5 to 50 ft per minute. Each of the two strands is controlled through the line independently.

The salt descaling unit in the line replaces mechanical scale breaking equipment. It is particularly suitable for the 400 series grades. The unit descales hot rolled strip by means of molten salt and electric grids, while cold-rolled strip

requires only molten salt. The salt is maintained at a temperature of 900°F by use of gas-fired burners.

Electric grids in the No. 1 salt pot are negative, while in the No. 2 salt pot the grids are positive. Because the tanks are insulated from one another, electrical current travels through

the strip in opposite polarity as it passes from the first tank to the second. Chemically, in the first tank the scale on the strip is oxidized. When it reached tank No. 2, the oxidized scale is dissolved. Scale breaking by this method coupled with further pickling produces any desired type of pickled finish.

Automatic Powder Scarfing

Before the slabs are heated for rolling into sheet and strip, they are delivered hot to an automatic powder-scarfing unit for surface conditioning. This method of conditioning stainless steels has been used successfully with single nozzle torches. The process was therefore selected for multiple-nozzle use in an effort to eliminate costly and time-consuming grinding.

On hot slabs, it would materially reduce conditioning time and costs. By speeding up the process, the time could be reduced sufficiently so that conditioning could be maintained at the same pace as the rest of the line.

Before the process could be adapted for multiple-nozzle scarfing, numerous obstacles had to be overcome. One of the biggest deterrents was the difficulty in dispensing the powdered iron uniformly and at the desired rate in four different directions simultaneously so that equally good results could be obtained on all four sides of the slabs.

Another problem involved the removal of resultant slag to prevent it from rolling ahead of the reaction zone and hindering the progressive scarfing action on the ensuing surface.

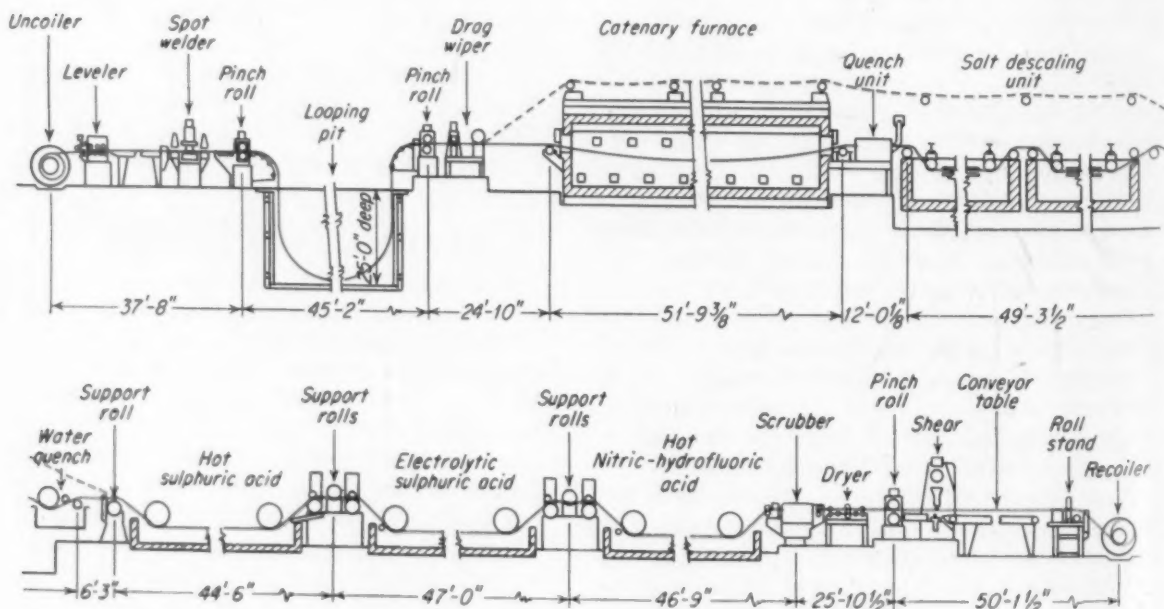
The scarfing unit was designed and built by Linde Air Products Co. From the blooming mill, slabs arrive at a temperature of about 1900°F. The speed at which slabs are scarfed

is variable, but scarfing is normally done at a linear speed of 90 to 120 ft per minute. Scarfing removes about 3 pct of the metal by weight, consuming about 2 cu ft of oxygen per pound of metal removed. Oxygen is fed to the nozzles at 30 to 40 psi, and iron powder flow rate is 5 to 10 oz per nozzle per minute under air pressure of 15 psi at the pneumatic powder dispenser.

The scarfing unit contains 48 scarfing nozzles in four banks. The top and bottom banks each have 18 slotted nozzles, and the side banks have six in each. Powder is fed to the reaction zone externally.

Slag resulting from scarfing is washed away by high-pressure cross-fire water jets directed on the slab just back of the scarfing flames. Another feature is that the same unit can also be used for scarfing carbon steels for which powder is not required.

After scarfing, the slabs are cooled on the mill bed, then moved to a Wheelabrator machine for further conditioning. In this machine, steel shot is blasted against all four slab sides simultaneously at high velocity to remove any traces of slag remaining from the scarfing operation. A full range of slab and billet sizes can be handled by this machine at production rates in keeping with the line.



ANNEALING and pickling line is flexible enough to process all grades of hot- and cold-rolled

stainless strip. It handles two strands simultaneously at rates from 5 to 50 fpm.

Automatic Tapping Machine Speeds Production, Reduces Tap Breakage

♦ TO REDUCE TAP BREAKAGE and speed production in the tapping of phenolic moldings, International Business Machines Corp. switched from hand controlled to automatic tapping at its Endicott, N. Y., plant. The changeover was accomplished on a new machine equipped with two spindles, carbide taps and a 12-station dial indexing table. With the new method, savings per year equal three times the machine cost.

Wire contact relays are a major product of IBM's Endicott plant. The relay bases are phenolic moldings and each has two holes 1.120 in. apart that are tapped for fastening screws.

Until recently, hand controlled tappers were used. But production was slow and tap breakage frequent with the small taps used to produce a 3-48 size thread. To do better and faster work, the setup illustrated here was developed and is now in active production. It is a two-spindle Cleveland Automatic tapping machine with a dial carrying 12 equally spaced fixtures. For precision and rapid, impact-free indexing, the dial has a Geneva movement.

The setup is completely automatic except for hand loading of each molding onto a fixture. Precise positioning for perfect alignment of holes with taps is necessary to minimize tap breakage. Moldings are made to close tolerances and the fixtures fit each molding perfectly.

After hand loading at the first station, each molding is quickly indexed through the next four stations, which are blank. At the sixth station, the ram of a small air cylinder is lowered automatically to press the molding firmly against its seat. A microswitch at the seventh station has vertical pins that must line up precisely with the two holes to be tapped. If this condition is not met, the switch is tripped so that automatic tapping is not attempted at the next station. This preliminary check greatly reduces the chance of tap breakage.

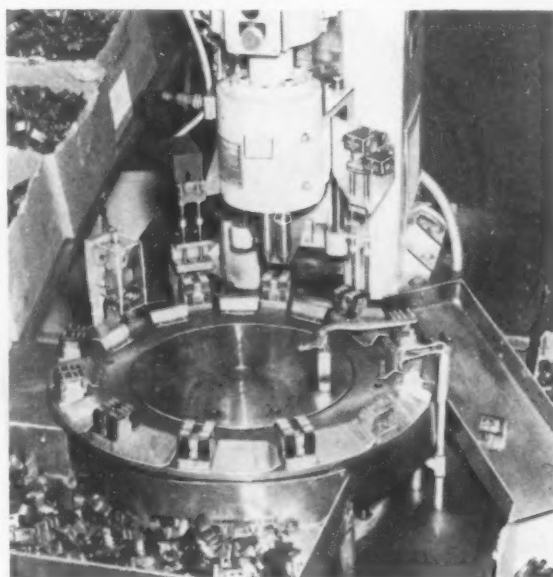
The carbide taps used are not as strong as high speed steel taps, but they remain sharp much longer and often tap several thousand holes before replacement. Tapping speed is 2200 rpm and the length of each thread is $\frac{1}{2}$ in. An

important factor contributing to longer tool life is the use of air jets which blow on the taps while they are elevated to cool them while removing chips.

At the ninth station a counter indicates the number of parts tapped. An ejector at the tenth station automatically lifts the tapped molding out of the fixture so that it drops into a chute leading to a tote box.

At the eleventh station a pair of intermittent air jets blow any chips off the fixture, leaving it ready for reloading at any of the next three stations, all of which are close to the operator.

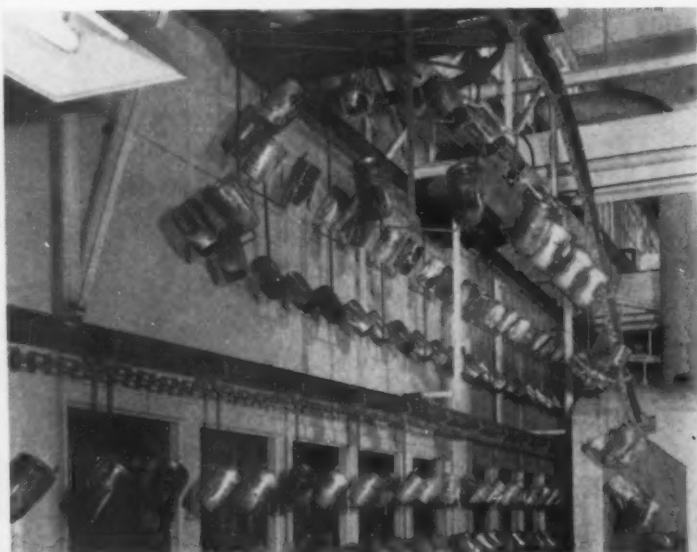
Several models of molded relay bases fit the same fixtures for production tapping on this machine. With the different molding, tapping rates vary from about 6000 to 9000 pieces per 8-hour shift. This is fast tapping on phenolic moldings and about five times as fast as tapping.



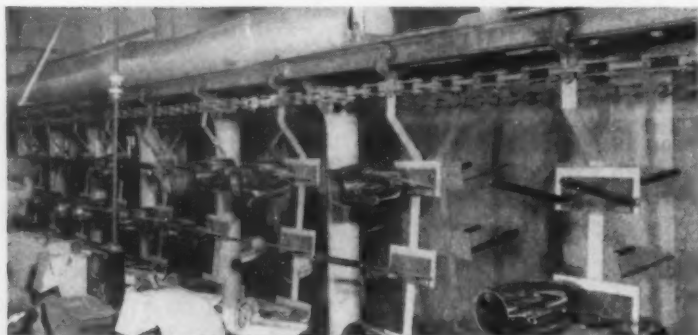
AUTOMATIC except for hand loading, this two-spindle machine taps 6000 to 9000 phenolic moldings per hour. Production is five times the former hand controlled rate.



START of percolator production. Copper stock is drawn into flat pans and placed on upper hangers of this trolley conveyor for washing and drying. After annealing and redrawing, percolator bodies are placed on lower hangers of same conveyor for a wash and dry.



PERCOLATOR bodies are spun and trimmed to shape, then washed before and after spouts are soldered and designs embossed. This conveyor takes units through the washer (lower right) and returns on the lower run.



COMPLETE with spouts, washed percolator bodies are carried on the four top hangers of this trolley conveyor to any of eight bench jacks for color buffing. After a visual inspection they are placed in protective canvas slings.

Cuts part damage—

EFFICIENT CONVEYOR SETUP Stores Material, Reduces Work in Process

♦ There are 98 operations between raw coiled stock and sealed shipping cartons in the manufacture of automatic percolators at Landers, Frary & Clark . . . To avoid work pileups and keep part damage at a minimum, a carefully planned conveyor system was installed. All handling units mesh perfectly for smooth, trouble-free production.

By H. J. McCormick, Sales Manager,
Caldwell Plant, Link-Belt Co., Chicago

♦ A CAREFULLY PLANNED conveyor system weaves efficiently through 98 manufacturing steps in the volume production of automatic electric coffee percolators at the Landers, Frary & Clark plant in New Britain, Conn. Various types of conveyor units are integrated in the start-to-finish line which begins with coils of copper strip and ends by delivering cartons of finished percolators to a storage warehouse.

The system was designed and installed by the Link-Belt Co. as a coordinated unit to cut down on work in process. There is no more than 20 minutes' storage between any of the operations, except for a method of overhead storage of percolator bodies just before final assembly. The smoothness of this material handling setup has greatly reduced damage to work in progress.

The complete system includes eight overhead trolley conveyors totaling 2851 ft in length, 16 belt conveyors totaling 586-ft centers, two final

assembly slat conveyors, two calibrating oven-pallet conveyors, four revolving spout-soldering tables, a monorail, numerous gravity roll conveyors, and chutes.

The layout is designed for two-shift operation up to the point of final assembly, and one-shift operation on two parallel lines through final assembly, inspection and packaging.

An overhead storage conveyor provides live storage ahead of final assembly, permitting evening shift production of percolator bodies to accumulate for morning assembly. This conveyor delivers to each of two parallel assembly lines.

Bring work to operator

The percolator bodies move through the production and assembly operations almost wholly by conveyors which bring the work within easy reach of the operator. Even short intermediate transfers provide continuous flow rather than batch handling, by means of flat roll and slider belt conveyors.

The system was designed for the convenience of female help wherever possible in the damage-free handling of delicate, highly polished materials. About three-quarters of the firm's production and assembly employees are women.

Routes of the flexible, overhead trolley conveyor are readily adapted by means of dips, rises and horizontal turns, to carry work in the desired path from machine to machine, and yet keep it overhead and out of the way except as needed.

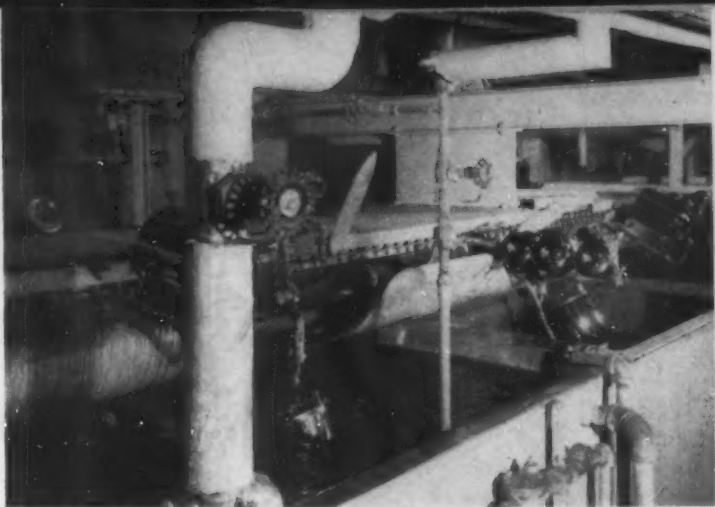
Five of the eight overhead conveyors carry the work through more than one production step. One conveyor carries percolator bodies through a washing machine and a dry-off oven at two separate process stages. Another conveyor carries work pieces twice through a washing machine, once before and once after the spouts are put on.

The layout is arranged to use a maximum portion of the conveyor runs. The eight overhead units run empty for only about one-fourth of their total length. But better than half of this amount is accounted for in the return run of conveyor No. 8, which carries the packaged percolators to a third floor warehouse.

Smooth flow raises production

The two Link-Belt slat conveyors used for final assembly are 130-ft centers, with slats 12 in. wide on 6-in. centers. They are mounted on rivetless chain. Fixtures on which the percolators rest are on 12-in. centers. These conveyors are built to carry percolators either upright or upside down.

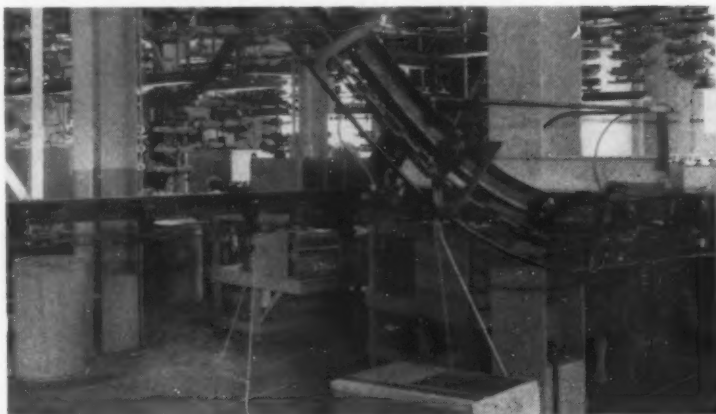
The smooth, continuous flow of material in this integrated system results in high production, pleasant working conditions and gentle handling of work in progress.



AFTER buffing, percolator body units are conveyed through this Lasalco plating machine. This single conveyor immerses the percolators in 23 separate baths in the process of applying bright nickel and chrome finishes.



TWO parallel assembly lines are fed from actual storage maintained in the overhead six-sling conveyor. Slings descend at center right where percolators are removed for final assembly on slat-type conveyor lines.



CARTONS are automatically sealed and picked up by the two-finger carriers of this conveyor for delivery to warehouse. Here, cartons are stencilled on a flat belt conveyor and carried to a spiral loading chute.

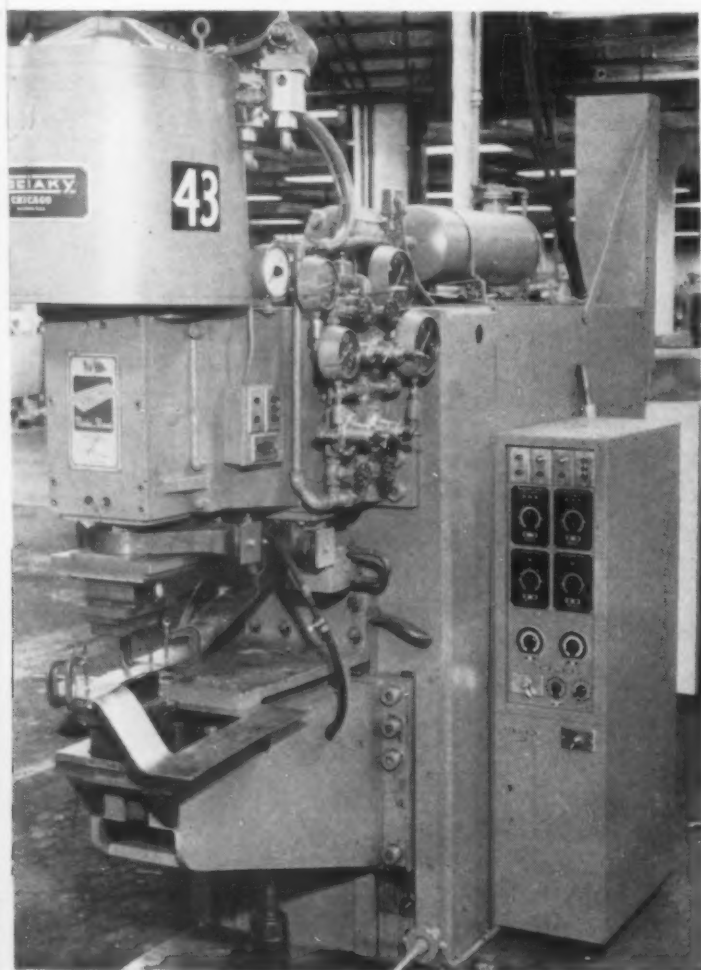
Close temperature control—

Resistance Heating, Pressure Combined to Rapidly Form Aluminum Extrusion

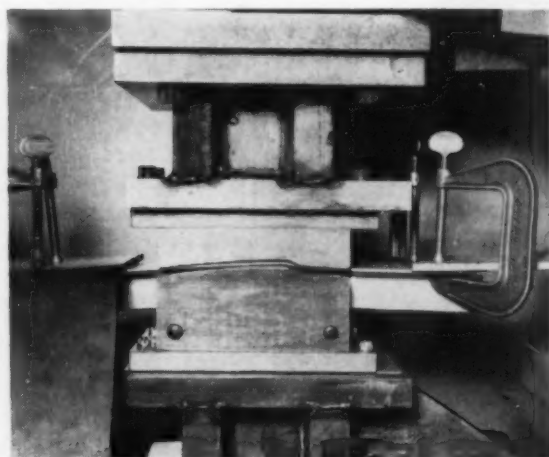
♦ Resistance heating for forming metals that require close temperature control has many desirable features . . . Forming temperature is never exceeded and the part is never removed from the heat source . . . No time is needed to move the part and there is no heat loss between the heat source and pressure source.

♦ A three-phase spotwelder is used to heat and apply the pressure to form the part . . . Regular forming press dies were adapted to the welder . . . Heating and forming of a 75S-T6 aluminum T section was accomplished in 8 seconds . . . Metallurgical tests show no evidence of cracking in the area of the offset . . . Material is not overaged.

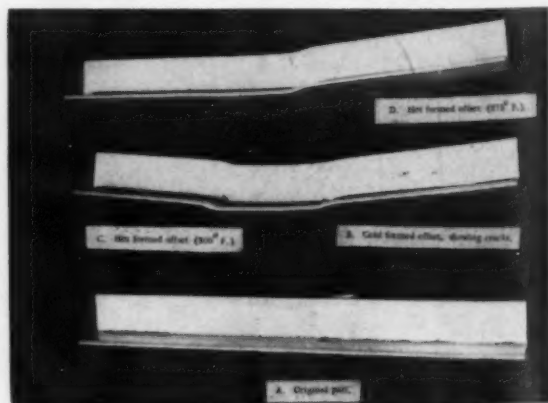
By W. D. Latiano, Metallurgical Editor



THREE-PHASE spotwelder uses punch press dies, applies heat and pressure for forming.



BUS BARS are clamped to the part to be formed. Part is heated and formed in 8 seconds.



ALUMINUM ALLOY part cracks if formed under 275°F, forms well at 275° to 300°F.

◆ **RESISTANCE HEAT forming of 75S-T6 aluminum extrusions** has been successfully performed at Martin Aircraft. In initial tests, an offset or joggle was formed in a "T" section extrusion having a cross-sectional area of 3.92 sq in. A 400 kva, three-phase spotwelder was used to provide the current and pressure. The machine was adapted to take punch press offset dies.

The spotwelding machine was modified by removing the upper and lower electrodes and the lower horn. The dies were insulated from the secondary loop by removing the upper bus links and placing a nonconductor between the offsetting dies and the machine. To complete the secondary loop and connect the machine to the test part, bus bars were connected to the ends of the part by clamps. The dies were punch press offset dies normally used to offset 27ST aluminum alloy details at room temperature.

Tie bus connectors to part ends

The part was a section of a standard T shaped extruded stringer, with a 3-in. base and a 1½-in. flange. The material was 0.125 in. thick, giving the piece a cross-sectional area of 3.92 sq in. The offset was ½ in. long and 0.187 in. deep.

The aluminum test part was clamped in the die with approximately 4 in. protruding on each end. The bus connectors were then fastened to the protruding ends of the part.

An initial load of 3000 lb pressure was applied to the part to seat it firmly. Almost simultaneously electric current of low voltage and high amperage was applied until the desired temperature was attained. A temperature of 275°F was developed in 8 sec. The current was then shut off and full forming pressure of approximately 20,000 lb was applied.

No strain hardening occurred

Metallurgical examination of the extrusion after forming revealed no evidence of cracking in the area of the offset. A macro-etch test produced a uniform pattern of attack with no indication of forming flaws. Rockwell hardness tests showed that the material had not been softened or overaged during the heating cycle. The hardness values were 93-94.5, RB and were typical of 75S alloy in T6 condition. Qualitative determination for residual stresses indicate that no strain hardening occurred.

The resistance-heat forming process has a number of good features. It heats rapidly, concentrating its heat directly in the part to be formed. It provides precise temperature control. For production work a surface pyrometer can be used to automatically apply the forming pressure at the exact instant the forming temperature is reached. With these time, temperature, and pressure relationships under accurate

control, the resistance heat method of metal forming offers several practical advantages.

This development is one of the early phases of Martin's long-range program to develop resistance heating as a production process for all types of metal forming operations. Another phase of the development was the recently-announced technique for utilizing resistance heating for driving titanium rivets. The immediate goals of this program are to develop resistance-heating methods for use in forming magnesium, pure titanium, and titanium alloys, in addition to 75S-T6 aluminum alloy. These metals present a progressive increase in temperature requirements and usually require very close control over the amount of heat applied. The 75S-T6 aluminum can be formed within a very narrow range between 270°F and 300° to 350°F, the upper temperature depending on the time it is subjected to heating. Magnesium and pure titanium require approximately 600°F for some types of forming; titanium alloys are formed in the 900°F to 1000°F range.

Resistance heating appears to be the most likely method of heating these metals for forming for two reasons. The handling problem is reduced to a minimum. The extreme sensitivity of these metals to variations in temperature require that a method of heating be used that provides accurate control at the instant of forming. Resistance heating fills these requirements better than other methods available today.

Give accurate temperature control

The reason for accurate temperature control lies in the forming characteristics of the metals. If the forming temperature is too low, the metals will crack; if it is too high, there is a strong possibility the metal will become "overaged," or contaminated with elements from the atmosphere, or will lose its mechanical properties. The 75S-T6 aluminum alloy is typical. It will crack at 270°F, it will form properly in the range from 275°F to 290°F, but it will tend to become overaged at temperatures exceeding 300°F. The overaging process is conditioned by the amount of time the metal is exposed to the elevated temperature. If titanium is overheated, the metal has an affinity for the oxygen and nitrogen in the atmosphere. In its contaminated state it becomes brittle and loses its mechanical properties.

Martin experiments indicate that resistance heating provides exact temperatures to the part being formed within an extremely short period of time and solves some problems connected with heating for forming operations. The desired forming temperature is never exceeded. Heat is localized and does not affect physical properties of dimensions of the part beyond the forming area. No time is lost between heating and forming.

Size no object—

SELECTIVE FLAME HARDENING

Proves Economical for Large Parts

♦ Flame hardening is often preferable to other heat treatments on large iron and steel parts . . . Flame method is a logical choice when giant rolls, dies, etc., are too big for furnaces and quench tanks . . . Its economy is apparent where only certain part areas need a wear resistant surface . . . Through hardening would be unnecessary, might distort the work.

By S. S. Rolison, Chief Engineer, Detroit Flame Hardening Co., Detroit

♦ **FLAME HARDENING'S** versatility and economy show up to particular advantage in heat treating large iron and steel parts. Rolls for steel and paper mills, large crankshafts, heavy car wheels and huge press dies are typical of items frequently flame-hardened in preference to induction or furnace hardening.

Certain considerations, either singly or in combination, often shift the economic balance in favor of flame hardening. Choice of material, part size and weight, location and extent of hard areas, and possible distortion effects—all influence the choice of a hardening method.

Flame hardening can be applied to a broad list of ferrous alloys, as is shown in the accompanying table. And variations in the process will produce the desired combinations of surface hardness and core toughness.

Many times a part's size and weight is simply too great for convenient handling in furnaces and quench tanks. In such cases, selective or progressive flame hardening methods will do the job. It would be very expensive to furnace-heat and tank-quench a form die weighing perhaps 20 tons. But flame treatment would produce the required hardened sections quite economically.

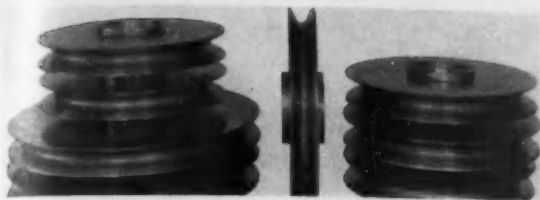
Quite often a part such as a large crankshaft may need hardening only on certain bearing surfaces. Confining the treatment to these areas by any method except flame hardening would probably take an elaborate, expensive setup.

To avoid excess cost, the entire shaft would most likely be heated and quenched. The shaft surface would then be completely, instead of selectively hardened. Such allover surface hardening would probably not be a drawback in actual crankshaft service. But the cost of handling and extra heating of unnecessary metal would be excessive compared to flame treatment of the bearing areas alone.

Flame hardening is often specified for particular part areas where allover furnace treatment might produce unwanted distortion. Such distortion would usually be compensated for by adequate finish machining allowances. But flame hardening would save the time and cost of extra work handling through a finish machining setup.

Similar distortion effects must be avoided when parts must be machined to finished tolerances for trial runs. Large press dies are often put through a short production test as a check on design, fit, etc. Such procedures would not be possible if the dies were to be through-hardened. They would have to be burdened with enough extra metal to machine distorted sections to final tolerances.

Since flame hardening would presumably be confined to elected radii or heavy wear areas on these dies, trial runs can be safely made on the finished-machined components. Subsequent flame treated of the critical wear areas will produce little or no distortion, and may or may not require a small amount of touchup grinding for precise fitting.



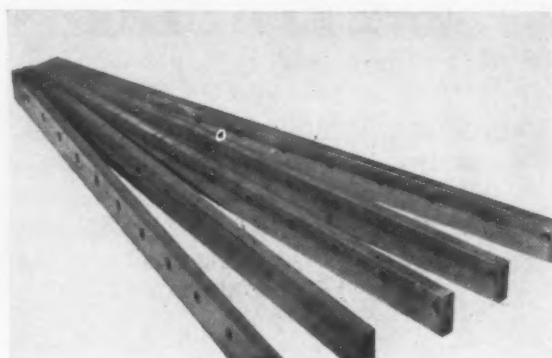
POWER shovel sheave wheels from 28 to 40 in. in diam are finish-machined before wear surfaces are inexpensively flame-hardened. Selective hardening is fast and accurate.



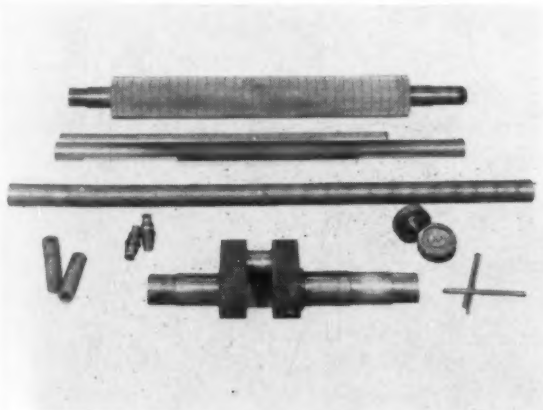
LARGE cast iron part is flame-hardened only on the cylindrical bearing surfaces. This method offers a cost advantage for similar parts such as journals, wobbler pads, boxes.



FLAME hardening cuts cost, adds to service life of dies weighing 1 lb to 20 tons. Dies can be finished and tried out before they are finally flame-hardened for production runs.



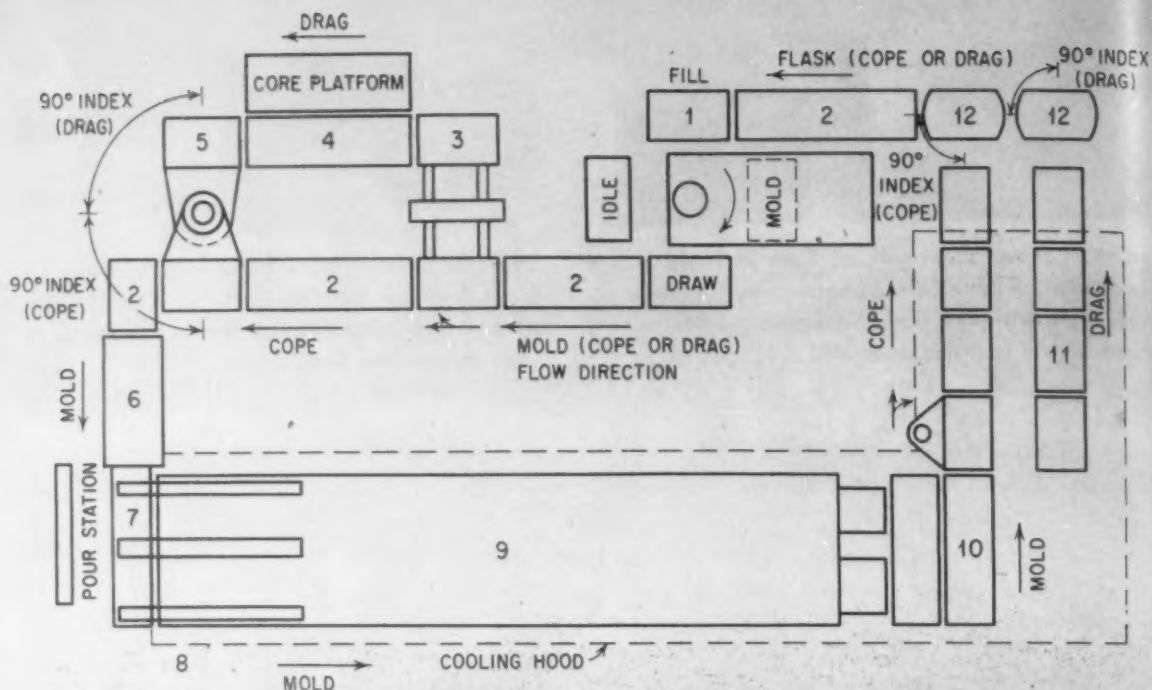
MACHINE ways of cast iron or steel can be finished to size, then flame-hardened separately or as part of the machine base. A final grinding is recommended on the hardened surface.



VERSATILITY of the flame hardening process is demonstrated on countless cylindrical items such as small shafts, tubing, crankshafts, spiral screws and corrugating rolls.



FLAME hardening the surface of large crusher rolls gives a deep, hard case and added service life. Core remains machinable. Rolls can be rebuilt by welding and hardened again.



AUTOMATIC MOLDING UNIT gives the foundry industry the automation already available in other metalworking industries. Units in the automated setup include: (1) Molding Machine, (2) Roller Conveyors, (3) Drag Rock-over Ma-

chine, (4) Roller Conveyor, (5) Close Machine, (6) Transfer Machine, (7) Pour Station, (8) Weight Setter, (9) Cooling Conveyor, (10) Elevator Transfer Machine, (11) Automatic Shake-out, (12) Flask Transfer Machine.

Interlocking units—

AUTOMATION UNIT

Performs All Operations In Casting of Small Parts

By L. F. Miller, Vice President, Machine Div., The Osborn Mfg. Co., Cleveland

♦ Automatic foundry operation, from filling flasks to shakeout, has been made possible with an integrated automation unit . . . Designed to meet individual foundry needs, the equipment combines a series of both usual and unusual handling devices.

♦ Interlocking controls permit the units to operate together with clock-like regularity . . . Production in this installation is expected to reach 300 multiple cavity molds per hour . . . Major savings in labor and in space requirements have been achieved.

♦ Twelve separate operations are combined in the system . . . Floor area has been reduced to a quarter of that needed for more conventional foundry layouts.

♦ AUTOMATION in the foundry is a reality with a circuit molding system recently developed and placed in operation in the malleable iron foundry of Eberhard Mfg. Co., Cleveland. This unit is capable of producing 300 molds per hour with a casting weight range from 1 oz to 2½ lb. This production would net from 1 to 10 castings per second. The number of castings per mold will vary from about 12 to 60.

The unusual system, which combines 12 separate operations, was developed by Osborn Mfg. Co., and is built around Osborn's new automatic molding machine. The entire system covers a floor area 100 x 72 ft. Conventional foundry practice, to produce 300 sand molds per hour, usually requires four times the floor area.

The automatic unit performs the operations of molding, closing, clamping, cooling, stripping, and shaking out. Flasks are not handled by an operator at any time. Only if it is necessary to set chaplets or cores would there be a need for workers other than a watchman to maintain a constant check of the control panel warning lights. After castings are shaken out, they are conveyed away for finishing operations. Empty flasks are returned to the molding unit. The system is a package unit. The length of conveyors in the unit will change with the length of flask, a factor determined by the needs of each factory.

In multiples of flask lengths

Machines in the system are interlocked by electrical and pneumatic controls and the handling equipment is built in multiples of flask lengths. Controls are designed to act in conjunction with the cycle time interval of the molding unit. Flasks move progressively through the system a flask length at a time. Flasks are moved in two ways: First, by a pusher cylinder with stroke equivalent to a flask length; second, where flasks are at the same elevation, by using one flask to push another. Whenever there is a change of elevation, another pusher cylinder is incorporated.

The flow of molds and the equipment involved in the system are shown in the schematic drawing. Half molds (copes and drags) are produced by the molding unit (1). This unit is fed cope and drag flasks alternately at the fill station. Here sand fills the flasks which are resting on cope or drag pattern equipment. This pattern equipment is mounted on the molding unit turntable and is indexed to the fill station to match the type flask (cope or drag) being fed to the unit at this point.

After filling to the proper level, the flask is indexed to the molding station. Here, it is rammed to correct compactness. It is then indexed to the draw station where the pattern is drawn from the mold and the mold ejected onto a flanged roller conveyor (2).

When a cope mold has been ejected from the molding unit, a drag mold follows in the next cycle. Upon ejection, the cope mold remains on the conveyor adjacent to the molding machine until the drag mold is ejected at the draw station. Ejection of the drag mold moves the cope a flask length along the roller conveyor away from the molding machine. This positions the drag mold in the space formerly occupied by the cope mold on the roller conveyor.

Successive ejections from the molding machine will continue this progressive movement of copes and drags along the conveyor. As the cope mold reaches the rockover unit (3), a limit switch makes this machine inoperative, allowing the cope mold to pass through and onto the roller conveyor to the left of the rockover.

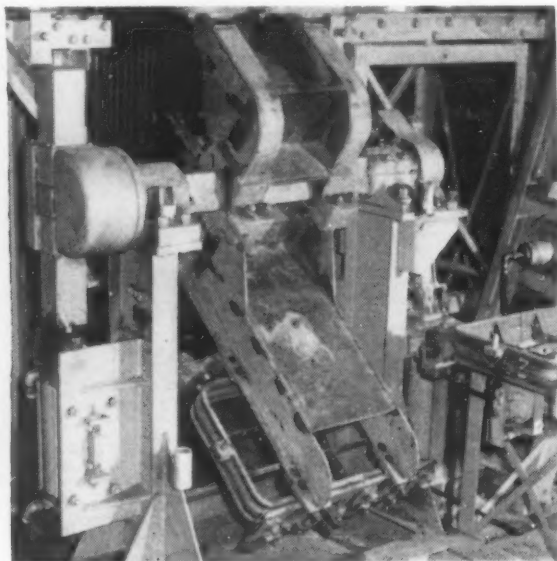
Drag goes over and down

As the drag mold follows the cope into the rockover, the machine automatically rocks the drag mold over and down to the coring level. The drag flask comes to rest face up. As this happens, an empty station of the rockover returns to the roll-off level, thus counter-balancing the rockover and saving the time otherwise required to rock back. After rocking the drag mold over and down, a pusher cylinder sends this flask out onto the roller conveyor (4) to be cored if necessary.

Copes and drags, now on separate conveyors, move progressively toward the close machine (5). The close machine swings a cope from conveyor (2) and a drag from conveyor (4) to



Cycle starts at molding machine . . .



Rockover separates mold halves . . .

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Casting type determines time in the cooling conveyor . . .

the close station. Here, the cope is at a higher level than the drag. The cope is closed on the drag and the completed mold ejected to a transfer device (6), allowing the stations of the close machine to swing back to their former positions. As soon as a second mold has been closed, it is ejected to the transfer device (6). By means of a pusher the two molds are shuttled to the pour platform (7).

When the transfer machine reaches position over pouring station, the pour platform machine lifts an empty pallet up to contact the bottom of the molds. These are carried up off the transfer device (6) until the molds contact cast iron wheels of the weight setter machine. These wheels, carried in slotted channels (8), act as weights to hold the cope to the drag while pouring and for as many more cycles as are needed for the type of work being done. The now empty transfer unit is free to be pulled back to its previous position to receive two more molds.

After pouring, the pallet carrying the two poured molds is pulled to the next position, a pallet length along cooling conveyor (9). The molds remain under the cast iron wheel weights for two or more cycles or moves. Cooling time is determined by the type of casting then in production.

The cooling conveyor (9) is composed of pallets end to end riding on rail supports of double deck design. The top deck is at the pour level and carries the poured molds two at a time, side by side, resting on the pallet platforms. The length of this conveyor deter-

mines cooling time and can be varied to meet individual requirements. The bottom deck is the return for the empty pallets.

The transfer of the two poured molds resting on their pallet to the cooling conveyor moves the entire line of loaded pallets one pallet length. This movement occurs at each transfer from the pour station. As a pallet on the rails of the cooling conveyor progresses to the end of the rails, it is pushed onto an elevator station.

The two molds resting on this pallet are then slid off the pallet onto the elevator transfer machine (10), at which time the elevator station, holding the now empty pallet, lowers the bottom deck of the cooling conveyor. At this level, the pallet begins its return trip to the pour platform.

An elevator transfer machine (10) raises the two molds to a level which will allow sand conveyor equipment to be placed under the shakeout machine (11). Then a pusher cylinder rolls the two molds into the shakeout machine, one at a time. The shakeout machine receives the molds at a cope strip and drag rock-over station and performs the shakeout operation.

Cope and drag pushed to shakeout

The cope is stripped up from the drag and the drag is rocked over until it is bottom up. The cope and drag are then pushed into the shake-out station which vibrates and pushes out the sand and casting. This method allows the shakeout to push sand away from the drag flask bars instead of into them and puts the flask in the proper position for return to the molding unit which requires the drag flask joint side down. After shakeout, cope and drag are moved into the flask transfer machine (12) by the copes and drags following behind.



Closing machine mates cope and drag . . .

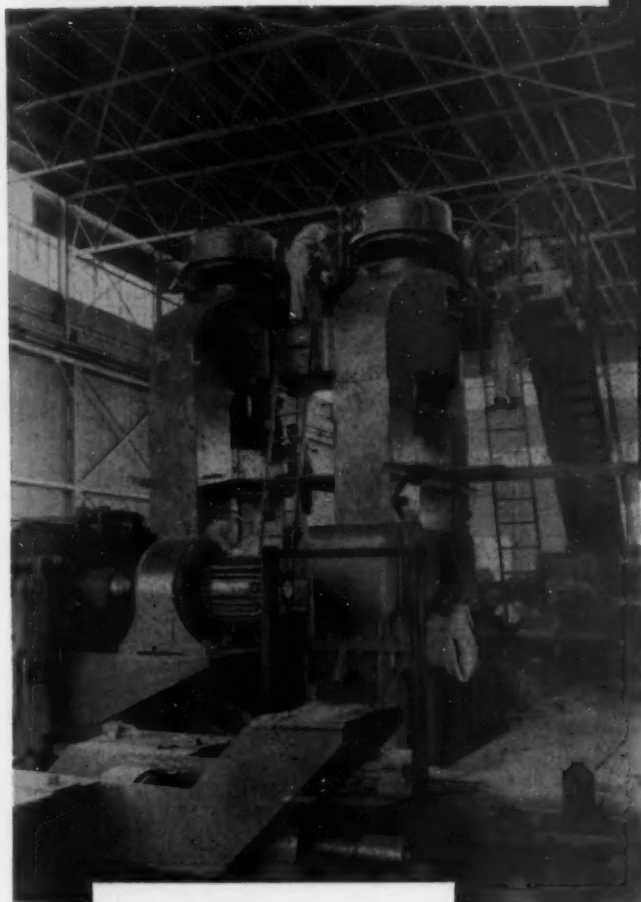


Automatic shakeout recovers casting . . .

COMING SOON!

COLD-ROLLED SHEETS FROM

Newport Steel



A reversing cold mill is one more new facility in the continuing expansion program at Newport Steel. Building construction and the mill itself with all supporting equipment already are well along, and early in 1955 cold-rolled sheets will be added to an already creditable list of Newport products. Sixty-nine years' experience, modern facilities, central location, and the irrevocable policy of giving customers an abundance of both quality and service—all make Newport a most dependable source for your steel requirements. Let us tell you more about our ability to serve you now and in the future.



ECONOMICAL WATERAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to industrial areas throughout the Middle West and South.

PRODUCTS OF NEWPORT STEEL

- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Electric Weld Line Pipe
- Hot-Rolled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Hot-Rolled Pickled Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

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FREE AIDS

New Technical Literature:

Super alloys

Super alloys, high strength heat and corrosion resistant materials, are the topic of this new brochure. These materials are used for the critical parts of jet engines and other forms of gas turbines, turbo-superchargers, rockets and guided missiles. The pamphlet includes notes on the uses and characteristics of some of the super alloy grades. Tables and charts illustrate the properties of these materials. *Universal-Cyclops Steel Corp.*

For free copy circle No. 1 on postcard, p. 137.

Air compressors

The Curtis line of air compressors is covered in this new catalog. Emphasized are the products' performance, dependability and long life. Design features are shown. Air tanks and air fittings and accessories are also shown. Complete specifications are given. Capacity and size data are given. *Curtis Pneumatic Machinery Div., Curtis Mfg. Co.*

For free copy circle No. 2 on postcard, p. 137.

Greater efficiency

The problems of greater efficiency are discussed in this bulletin. Greater utilization of capital equipment and methods of pinpointing and overcoming sources of inefficient plant and machinery operation are discussed. Eight steps in attaining efficiency objectives are included. *Barry Corp.*

For free copy circle No. 3 on postcard, p. 137.

Delpark filters

Delpark filters for use with Landis precision grinders are featured in this new folder. Illustrated is one of the newest Landis grinders, the No. 12 centerless grinding machine. Specifications are included. *Industrial Filtration Co.*

For free copy circle No. 4 on postcard, p. 137.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 137.

Worm gear jack

A worm wear jack that speeds up the raising and lowering of movable parts in metalworking machinery is featured in this new manual. Applications include the elevation of mill tables, rolls, conveyors, machine beds, molds and dies, furnace lids, loading platforms, loading racks, arbor presses and hinged mechanisms. Complete specifications are given. *Duff-Norton Mfg. Co.*

For free copy circle No. 5 on postcard, p. 137.

Cyclone dustcollectors

The new Cyclone "8" Model CYO-8, is introduced in this bulletin. The unit is available for exhaust to the outdoors, and can also be exhausted into three self-contained dust collecting bags. Applications include buffing, polishing, general grinding, woodworking, plastics, glass, fibre, leather, textiles, etc. Specifications are given. *Hammond Machinery Builders, Inc.*

For free copy circle No. 6 on postcard, p. 137.

Collet mandrels

The Westberg line of collet mandrels is shown in this booklet. Featured is the simplified expanding mandrel. Among features discussed are shoes, square two-slotted collet mandrel, floating stop ring, blind hole, collet mandrel with teeth, threaded collet mandrel, taper holes and facing back end, milling and drilling, and grinding. Specifications are given. *E. Westberg Corp.*

For free copy circle No. 7 on postcard, p. 137.

Catalogs & Bulletins

Vacuum metallizing

Vacuum metallizing, the depositing of a thin coating of metal by evaporation and condensation under high vacuum conditions, is the topic of this new brochure. Stressed is the fact that vacuum metallizing gives a bright, lustrous, metallic finish on any base material, including plastic, metal, glass, paper and textiles. The process is described and its applications are illustrated in this brochure. Specifications for the complete range of Stokes vacuum metallizing equipment are given. *F. J. Stokes Machine Co.*

For free copy circle No. 8 on postcard, p. 137.

Relievomatic

The Relievomatic, a new special machine tool, is announced in this bulletin. This is a self-relieving tool for producing precise parts, free from any withdrawal marks, on automatic screw machines, lathes and other machine tools. The tool has been designed to eliminate the problem of rejects of production parts due to spirals and other marks made by cutting tools on their return pass. Design and construction features are listed. *Silber Products, Inc.*

For free copy circle No. 9 on postcard, p. 137.

Oil-gas burners

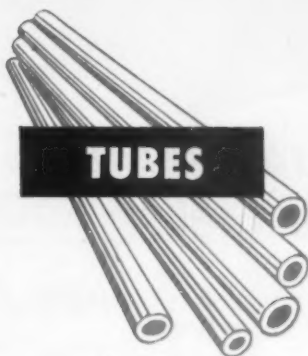
The Preferred combination oil-gas burners are the subject of this folder. Stressed is the fact that these burners burn oil and gas automatically, and that the change-over from one fuel to the other can be done automatically or by hand. Drawings point out the features of these burners. Electrical characteristics, standard equipment for fully-automatic burners, and extra equipment are also covered. Specifications are listed. *Preferred Utilities Mfg. Corp.*

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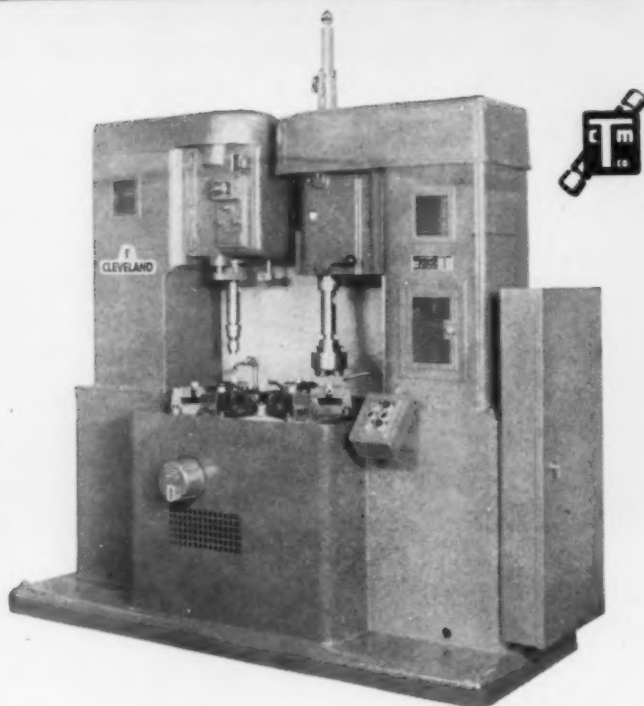
Contact our nearest office or write to Peterson Steels, Inc.,
Springfield Road, Union, New Jersey. Address: Dept. I

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Another Cleveland Design to Speed Production!



COMBINATION CLEVELAND REAMING AND THREADING MACHINE

PARTS: LB type fittings with external threads. Vapoil Connector Bodies 90°. Vapoil Connector Bodies straight.

MATERIAL: LB type fittings of Malleable Iron; other parts of cast aluminum.

A vertical combination machine consisting of a heavy duty Cleveland 21" Power Index Table, mounted on an all welded and normalized steel base with columns to support the machined units.



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Guide

The tapping unit is Model E-3 Cleveland Lead Screw Production Tapping Head.

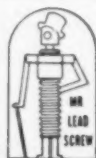
Mounted on top plate, six hand operated locating and clamping fixtures, with interchangeable jaw sets.

Write today for Catalog No. 1A-114

CLEVELAND

tapping machine co.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC. • CANTON 6, OHIO



FREE TECHNICAL LITERATURE

Data sheets

Zagar gearless drill heads are featured in these technical data sheets. These gearless drill heads can have drill and tap spindles as close as the sum of the drill diameters. Advantages include closer spacing of holes. Charts, drawings and pictures give additional information. Specifications are included. *Zagar Tool, Inc.*

For free copy circle No. 11 on postcard, p. 137.

Lathes

The Stevens line of polishing and buffing lathes is featured in this booklet. Among models shown are the single spindle lathe, single spindle lathe with overhand, polishing and buffing lathe, and extra heavy-duty lathe with overhand. Lathes and polishing room accessories are shown and discussed. Standard specifications for all lathes are given. *Frederic B. Stevens Inc.*

For free copy circle No. 12 on postcard, p. 137.

Engineering catalog

All W. C. Dillon products are listed in this general bulletin. Advantages of the equipment are described. Among items featured are the mechanical pressure gauge, universal tester and the dynamometer. Accessory equipment is also listed. Illustrations and charts give further information. Specifications are included. *W. C. Dillon & Co., Inc.*

For free copy circle No. 13 on postcard, p. 137.

Dial timer

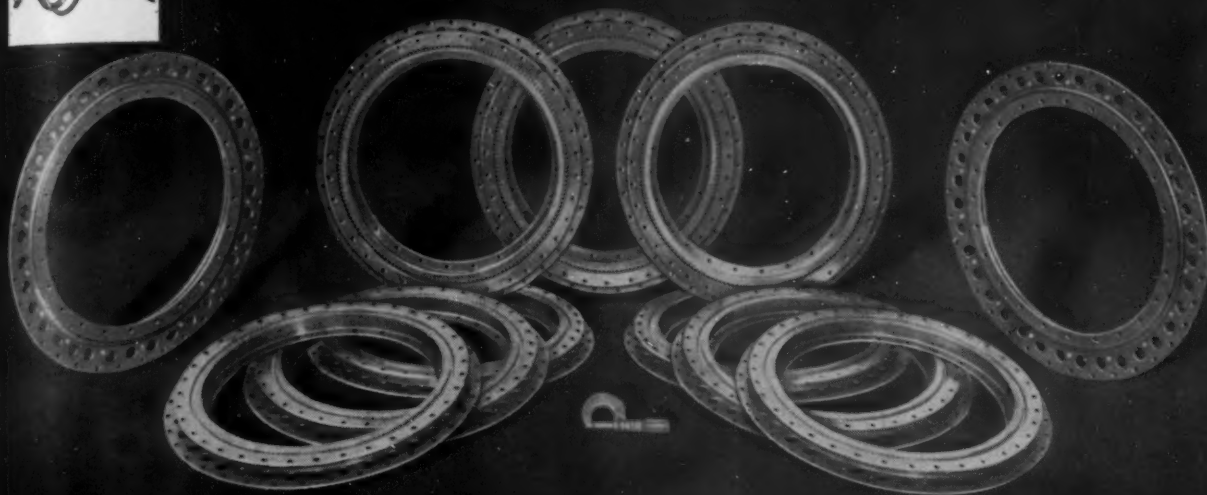
The "Duo-Set" timer is featured in this booklet. This timer is for controlling on-off cycling of two independently-adjusted load circuits in machines and process control. Applications include controlling electrically heated equipment, conveyor drives, solenoid valves, pumps, and other processes. Simplicity, accuracy, easy installation, and dependability of the timer are illustrated. *Automatic Temperature Control Co., Inc.*

For free copy circle No. 14 on postcard, p. 137.
Turn Page



Contact **KAYDON** Muskegon

FOR ALL TYPES OF BALL AND ROLLER BEARINGS: 4" BORE TO 120" OUTSIDE DIAMETER



Double-row radial ball bearings
11.375" x 16.000" x 1.062"

Pattern for precision...and profit

Make it standard procedure to contact Kaydon for Reali-Slim bearings

Ultra-precise lightweight bearings that perform to exceptionally high standards, yet require minimum space are KAYDON's specialty. Today, KAYDON offers you unmatched experience in the design of *Reali-Slim*, thin-section and/or high-precision bearings. Then, too, KAYDON has specially developed production facilities to build these bearings . . . economically . . . on either a custom or volume basis.

Follow the lead of many prominent manufacturers — make it standard practice to consult KAYDON of Muskegon on bearing problems. You'll find it pays in terms of time, money and the performance of your product.



Just Out! Get your copy of the new KAYDON
Reali-Slim thin bearing catalog No. 54.

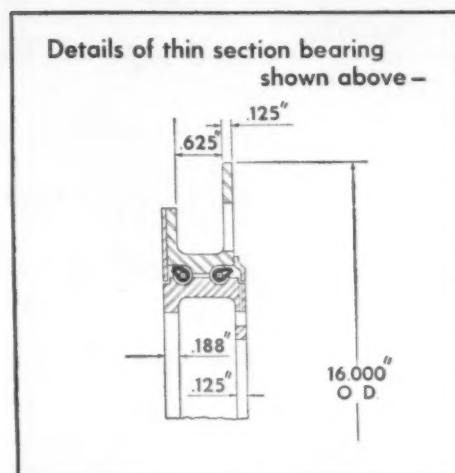
THE KAYDON

KAYDON Types of Standard and Special Bearings:
Spherical Roller • Taper Roller • Ball Radial • Ball Thrust
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K345

PRECISION BALL AND ROLLER BEARINGS



AUTOMATION: Speeds Bearing Assembly

Forming, assembly and packaging operations have been successfully combined in a multi-station press setup at New Departure . . . Uniformity, high production and improved quality have been achieved.

Low cost ball bearings can be made at a high production rate. Assembly labor costs, however, frequently are the highest cost item in the manufacture of the bearing.

A specially designed multiple station press is now being used by the New Departure Div. of General Motors Corp., Bristol, Conn., to make the assembly of a small thrust ball bearing automatic.

For Slow Speed Applications

The bearing has a 0.280-in. bore, an OD of 17/32 in. and a width of 0.228 in. Its static load rating is 500 lb, with rating of 100 lb at 500 rpm. This low cost bearing is used

for door hinges and other slow speed applications.

While this bearing required a comparatively high production rate, the principal problem lay not in the fabrication of individual parts, but in the economies of assembly of these into the final bearings.

In assembly operations for similar small parts, the human element not only affects quality and production rate, but handling cost also is a relatively large item.

New Departure's experience with integration and the development of fully automatic processes in bearing manufacture indicated the latter approach in the solution

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 137. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

to this particular assembly problem.

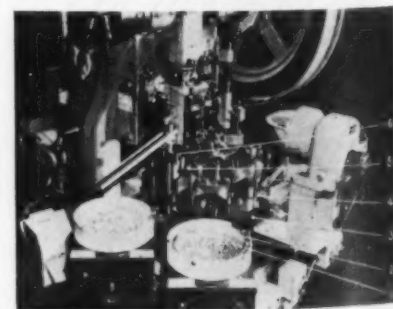
The specially designed, multiple station press has made bearing assembly entirely automatic. Uniformity, quality and high production are achieved with no scrap or rejections. Labor cost is reduced to a fraction of the total.

High Degree of Uniformity

The present rate of production is 52 completed bearings per min. Bearing parts are fed from unique vibrating magazines equipped with fixtures which automatically orient the parts into the correct assembly position.

The machine indexes through a series of six stations. If any part is incorrectly presented at its station, is off size or has suffered prior damage, a sensitive control stops the machine and the part is removed.


Sequence of the operations follows: (1) Shell is introduced open side up. (2) First race ring is



Six operations included . . .



Everyone recognizes this as a sign of Thanksgiving . . .

And smart gear users know this  is the sign of the best in custom made gears.

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THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

placed ball race up in shell. (3) Balls are inserted and spray lubricated. (4) Second ring is positioned ball race down on balls. (5) Shell is given first forming around ring and balls. (6) Shell is finish formed for size and running clearance with upper ring.

Assembly Entirely Automatic

Fully automatic operation and control results in a high degree of uniformity in the finished product. The nonacceptance of unsatisfactory components at every point assures the completion only of perfect bearings. By automatically stopping the machine before unsatisfactory parts can be assembled, possible injury to tools is prevented and loss of machine production time avoided.

Handling Cost Low

With operator time nearly eliminated and with the machine inspecting and rejecting during assembly, handling cost is extremely low and final inspection is considerably reduced.

As a final step, completed bearings are automatically counted into suitable lots and deposited in containers for shipping.

Coatings:

New ceramic coatings can be applied at low temperatures.

Ceramic coatings can now be applied chemically. The coatings are said to have many of the protective qualities of porcelain enamel plus some advantages not found in porcelain enamels. The coatings can be applied to almost any clean surface at temperatures of only a few hundred degrees, are not brittle, and are inexpensive. The process, called solution ceramics, was developed by the Armour Research Foundation of the Illinois Institute of Technology, Chicago, and is expected to have a great potential in industrial use.

Application Is Simple

Application of the coating is easy, requiring neither expensive equipment nor protected heating. The temperature is far lower than that required for porcelain enamel.

WHICH
METAL-CLEANING JOBS
WOULD YOU LIKE
TO IMPROVE?

Some good things
to know about
Metal Cleaning

Listed below are some of the operations discussed in Oakite's 44-page handsomely illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite methods can give you better production with greater economy.

Technical Service Representatives in
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SPECIALIZED INDUSTRIAL CLEANING
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MATERIALS • METHODS • SERVICE

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Tell me about Oakite methods and materials for the following jobs:

- ☐ Tank cleaning
- ☐ Machine cleaning
- ☐ Electrocleaning
- ☐ Pickling, deoxidizing
- ☐ Pre-paint treatment
- ☐ Zinc phosphate coating
- ☐ Paint stripping
- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention
- ☐ ALSO send me a FREE copy of your booklet "Some good things to know about Metal Cleaning".

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TORTURE TESTS PROVE



BEFORE TEST

Three standard cushion-type solid tires were used in this test. The Monarch Mono-Cushion was selected from stock awaiting shipment . . . competitive tires were purchased from authorized dealers of two other leading industrial tire manufacturers.



AFTER TEST

This unretouched photo shows comparative condition of same three tires after each had undergone an absolutely identical testing procedure. All tests were made the same day . . . using a constant time interval and same testing equipment.

... THE SUPERIORITY OF *Mono-Cushion*[®] INDUSTRIAL TIRES



TEST EQUIPMENT . . . a standard dual-drive lift truck carrying a loaded tote box weighing 4,864 pounds. Deliberate overload of approximately 44% created by mounting a single 22x6x16 cushion tire on each drive wheel (which normally carries dual tires of this size). Overload increased severity of test and accelerated tire fatigue.



TEST PROCEDURE . . . loaded truck was operated continuously at maximum speed for a fixed time interval. Truck's brakes were jammed on periodically throughout testing period to cause sudden stops and create extreme shock loads.



TEST TRACK . . . was a combination of black top and gravel road surfaces to simulate severe operating conditions (for both indoor and outdoor applications). A railroad spur in the plant yard was included in the test pattern.

HERE ARE THE FACTS THAT MEAN SAVINGS TO YOU



- (1) **ONLY MONO-CUSHION SURVIVED THE TEST . . .** the other tires were too damaged for normal use. TIRE "A" lost a section of tread 6 inches long and 1 inch deep. TIRE "B" was badly chipped and had two deep splits that reached almost to rim. This is additional proof that *Mono-Cushion* is a better buy . . . it costs less initially and lasts longer.
- (2) **MONO-CUSHIONS GIVE YOU MORE TON-MILES PER DOLLAR . . .** because the rubber stocks developed especially for these tires are compounded from *higher quality materials* than are used in the best "premium" passenger car tires. This is no idle claim. It is another fact previously known only by Monarch's key personnel.
- (3) **MONARCH SUPPLIES PERFORMANCE-PROVEN INDUSTRIAL SOLID TIRES.** Working closely with lift truck manufacturers, Monarch engineers have created tire and tread designs that assure maximum cushioning action for vehicles, loads, floors and drivers. A leading supplier of pressed-on tires, Monarch has a type and size to meet every lift truck requirement.

WHEN YOU NEED TIRES, REMEMBER MONARCH
... THE KING OF THE SOLIDS

- YOUR NEAREST MONARCH TIRE DEALER is listed in the Yellow Pages under "Trucks-Industrial-Parts & Supplies" or "Tires-Industrial". If current directory does not have a listing, write direct for complete catalog and name of nearest dealer.



230 Lincoln Park • Hartville, Ohio 3003-MR
7-255 General Motors Bldg., Detroit 2, Mich.

The thickness of coatings can be controlled accurately. While films as thick as .01 in. can be deposited, some coatings only a few millionths of an inch thick have been made.

Highly Resistant to Heat

Solution ceramic coatings are highly resistant to heat, and the more refractory coatings can be used to protect a metal, for instance, against molten metal or slag.

The coatings are not as hard as ordinary ceramic materials and can be scratched with a knife blade. Sheet metals coated with solution ceramics can be stamped after coating.

Resist Chemical Attack

Most of these coatings are so adherent to the surface of the underlying material that other coatings can be anchored to them. Like most ceramic materials, solution ceramic coatings are themselves resistant to chemical attack, even at high temperatures. This is especially evident when the ceramic itself is refractory and stable.

Process Will Be Licensed

The process will be made available to industrial firms through license agreements which will allow them to use Foundation patents now applied for.

Royalties from licensees will be used for further research on solution ceramics. Research findings will be made available exclusively to licensees.

Many widely different solution ceramics have been considered. Those studied most intensively were refractory metal-oxides—zirconia, chromia, titania, ceria, magnesia, and similar materials.

Can Use Many Materials

The process, however, is not limited to such compounds. Certain phosphates, silicates, fluosilicates, oxyhalides, and even metals, it is claimed can be deposited in this way, and two or more of the materials can be co-deposited or applied in separate layers.

TECHNICAL BRIEFS

TURBINES:

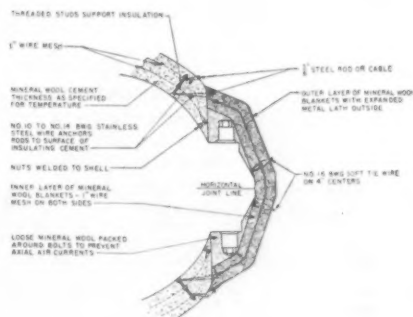
New flange insulation technique cuts turbine inspection time.

A blanket method of flange insulation has recently been developed which requires only a fraction of the time for removal and replacement in the internal inspection of turbines.

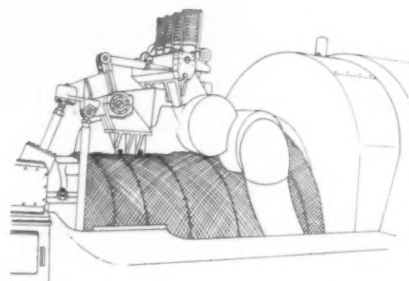
The most widely used technique has been to cover the entire turbine shell and flanges with a plastic insulation such as mineral wool cement in thicknesses from 4 to 9 in. To remove the upper turbine shell for inspection, the hardened insulating cement must be knocked away from the nuts and bolts joining the flanges as well as from the flanges themselves. After the turbine has been inspected, repaired and reassembled, several days are usually required to reapply the insulating cement.

Still Takes Time

In the second most common method, the flanges are boxed-in by sections of block insulation cut to size and wired in position. Cracks in the box structure are then filled with insulating cement and a cement finish is usually applied. The insulation is much



Uses tie wires . . .



Completely insulated . . .

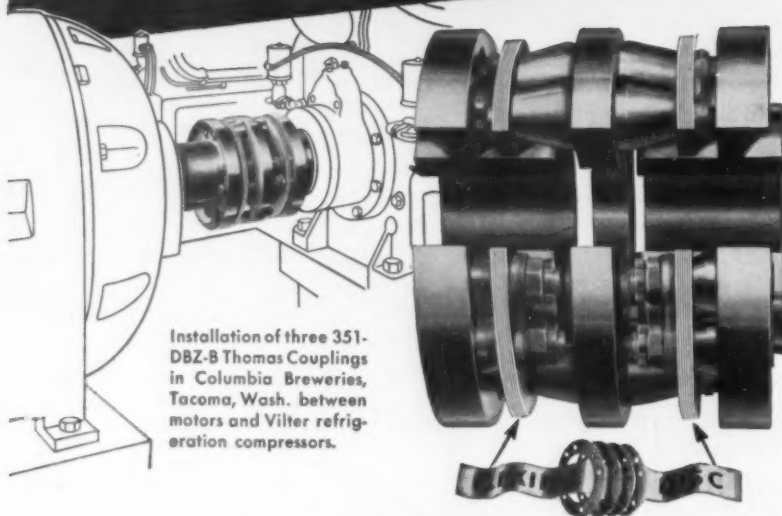
Turbine shell is covered with several layers of mineral wool, cement separated by wire mesh . . .

easier to remove than in the first method but is equally difficult and time-consuming to replace. Also, much insulating material is lost at each inspection.

The new blanket insulation method does not disturb the insulation at all and requires only the

cutting and replacement of the wires. As in the other techniques, the turbine shell itself is covered with several layers of mineral wool cement separated by one-inch wire mesh. The cement covering is beveled down on both sides of the flange.

THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

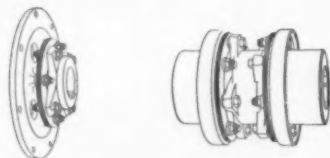
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

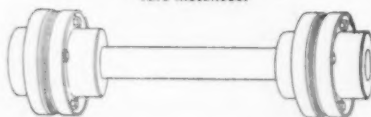


Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



A $\frac{3}{8}$ -in. steel rod or cable is extended along each beveled edge parallel to the flange. It is held in place by stainless steel wires from the threaded studs welded to the turbine shell to secure the 1-in. wire mesh. Mineral wool blankets, usually the 24x96-in. size, are cut and shaped to fit over the flange and are secured with soft tie wires to the steel rods on either side.

The flange is insulated with two layers of blanket insulation secured in the same manner to two sets of rods. The inner layer of insulation has 1-in. wire mesh on both sides, while the outer layer is applied with wire mesh on the inside and a facing of expanded metal lath on the outside. Since the turbine shell will be covered with a sheet metal housing, no finish is installed over the blanket insulation.

The blankets may be further secured by tie wires through the insulation from nuts welded to the flange. These tie wires, as well as those holding the blanket edges together and to the steel rods, are spaced at roughly 4-in. intervals. Frequently, loose mineral wool insulation is packed in around the bolts to prevent axial air currents.

Less Material Required

Because blanket insulation is more efficient, smaller thicknesses are equally effective in the normal turbine operating range from 900°F to 1100°F. Considering both relative thermal conductivity and average temperature at the flanges, blanket thickness has been roughly assumed as 60 pct of the specified maximum thickness of insulating cement on the hottest section of the turbine shell.

Two layers of blanket insulation are normally used because a single layer would be too difficult to shape around the comparatively short flange section.

Because it is possible that standard galvanized wire might oxidize at the usual turbine operating temperatures, monel wire mesh and even monel tie wires have been specified to insure trouble-free service.

The flange insulation is removed

simply by cutting the tie wires to the steel rods and those attached through the insulation to the expanded metal lath facing on the outside. The blanket covering is then lifted off in several large sections. After inspection is completed, new tie wires are simply attached to the rods and welded nuts and the blanket sections are wired back in place.

Heat Treating:

Grid permits use of roller hearth furnace for Al wire.

A newly developed material handling grid is being used to treat heat coiled aluminum wire in a roller hearth furnace previously used for heat treating bars. This system has broken a heat treating bottleneck at a Midwest plant and has improved product quality.

Heat treating of aluminum wire and rod is a major operation at the Newark, O., Plant of Kaiser Aluminum and Chemical Corp. The furnace uses a powered, roller-type conveyor originally designed for handling rod lengths.

Coils lay flat on a grate-type grid to move through the heating and quenching operations. The grid is subjected first to temperature ranges that reach 1000°F., then to rapid spray quenches of 60° to 80°F.

Water Spray Must Penetrate

The grating must have sufficient open area to allow proper penetration of the water spray from below the grid—a critical factor in heat treating aluminum alloy—because uniform temperature con-

trol is required during quenching to achieve uniform properties.

In addition, the grid must be flexible to permit expansion and contraction and at the same time retain its stability against warpage.

Carbon-steel gratings had sharp edges and warped and oxidized in a relatively short time. These conditions tended to score the surfaces of the coiled rod. Coil lay-down areas also were frequently restricted by warpage at the ex-

pense of proper load distribution. The results were slower operation, difficulty in maintaining quality standards and increased costs.

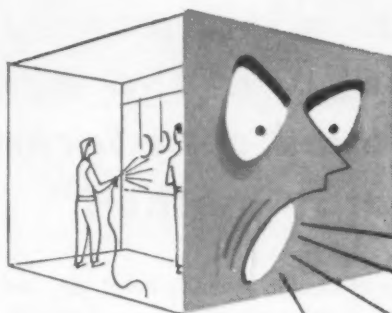
Flexible, Ribbed Network

A grid design of patented Serpentine construction produced by Rolock, Inc., of Fairfield, Conn., was adapted for use in this plant. This grid incorporates a flexible, ribbed network of bars secured with cross tie rods, washers and

why tolerate costly

spray booth

maintenance?



get

Du BOIS

Engineered Maintenance Program

Actual case histories reveal that each spray booth, if improperly maintained, can cost thousands of unnecessary dollars due to clogged equipment, spoiled production, unreclaimable paint and preventable booth repairs. DuBois Engineered Maintenance Program guarantees to cut costs by eliminating these problems through analysis of your operation and the installation of prescribed specialized DuBois compounds:

- KLARIFIANTS . . . water-wash compounds that control overspray.
- FILMITES . . . coatings for dry areas of spray booths.

- PEEL FILMITE . . . flame-proof peelable plastic film.
- STRYPP . . . for periodic purging of old paint deposits in hydraulic system.

Contact DuBois today for details on this complete service.

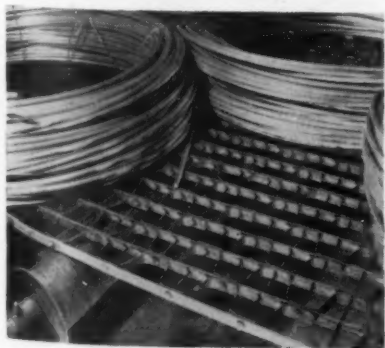
FREE . . . spray booth maintenance check chart. Write for your weekly-monthly program for proper spray booth maintenance.

Dept. G

The Du BOIS Co., Inc.

Cincinnati 3, Ohio • Los Angeles 33, Calif.

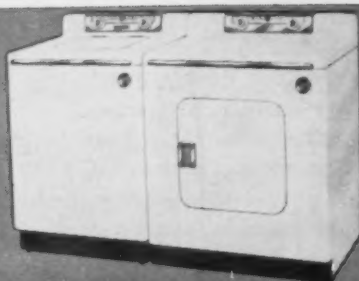
DuBois warehouses and representatives from coast to coast



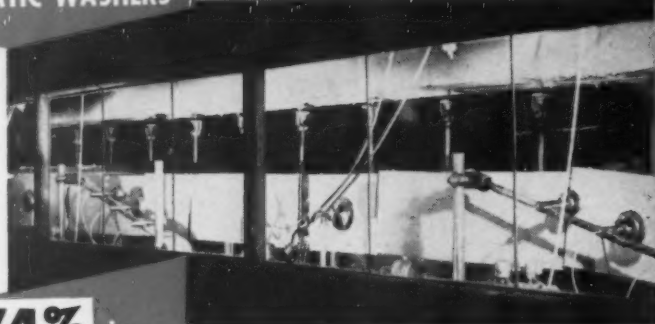
Coils move on grid . . .

with the
**RANSBURG
NO. 2 PROCESS**
Paint mileage jumps

84%
in the finishing of
G-E AUTOMATIC WASHERS



...and **74%** in
finishing G-E DRYERS



Production is increased and quality of the work is improved over former hand spray method

● When General Electric formerly hand sprayed their home laundry equipment—automatic washers and dryers—they painted 9.74 washers with a gallon of paint. Now, in the new and modern plant at Appliance Park, Louisville—where they're using the Ransburg No. 2 Process—they get 17.97 units per gallon of paint. An increase of 84%!

And, where they formerly got 5.49 dryers per mixed gallon of finish, now—with the Ransburg No. 2 Electrostatic Spray Process—they get 9.56 dryers per gallon of paint. An increase of 74%!

Along with increased production, G.E. is getting a more uniform, higher quality finish. Another typical, on-the-job-example of the unmatched efficiencies of the Ransburg No. 2 Process of electrostatic spray painting!

Want to know what Ransburg Electrostatic Processes can do for you in your finishing department? Ask about the complete facilities for test-painting YOUR products—under simulated production conditions—in Ransburg laboratories.

Ransburg

ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG



Through heat treating . . .

nuts, as well as being light in construction and reasonable in cost.

The grid plan area is 24 by 6 ft and is constructed of heat resisting alloy steel. Clearances in the grid assembly satisfy the expansion and contraction relationship between the coiled aluminum rod and the grid and all bars in the grid have rolled smooth edges which prevent scratching.

Marking:

**Silk screen process
speeded by photo film.**

A difficult job of marking painted steel cabinets has been simplified by using a silk screen process at Grand Sheet Metal Prod. Co., Chicago. Data to be marked on the cabinets is first placed on Eastman Ektograph film then transferred to a silk screen.

The job consisted of marking of steel cabinets which had been baked to a wrinkle finish. The uneven surface of this finish could not take direct silk screen imprints because wrinkle-finishes make most silk screen stencils break down after only a dozen or two dozen impressions.

With the new process as many



First step in process . . .



Backing peeled off . . .

as several thousand impressions can be made directly on wrinkle finished cabinets.

First step in preparing a screen is to place the proper numbers and letters on a sheet of clear acetate in positions corresponding with a diagram of the cabinet to be marked.

Use Contact Printer

When this acetate setup is completed, it is exposed with a sheet of process film in a contact box, producing a negative of the type set-up. This negative is then printed on another piece of process film, producing the positive from which the Kodak Ektograph Film stencil can be made.

While still wet, the film is fitted onto the specially prepared screen and the excess moisture is blotted away with paper towels. After the film has taken a firm hold of the silk, the screen is dried. After drying, the acetate backing is peeled off the film, leaving the finished, ready-to-use screen.

The completed screen is then fitted with guides which locate it over the proper position on the cabinet to be marked.



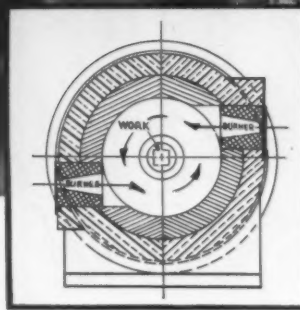
Using the screen . . .



HI-HEAD FURNACE HEATS STEEL SLABS



R-S "Hi-Head" Furnace* installed in Atlas Steels, Ltd., Welland, Ont., is 73' long, heats 25 tons of stainless steel slabs per hour with "wrap-around" flame action.



"Wrap-around" flame action HEATS 25 TONS OF STAINLESS PER HOUR

Atlas Steels, Ltd., Welland, Ont., Canada, recently installed an R-S "Hi-Head" Furnace for heating stainless steel slabs for rolling. The furnace is designed to heat 25 tons of slabs 20" wide and 2½" maximum thickness per hour. They are fed through the 73-ft. furnace in long slab lengths. The "wrap-around" flame action brings the steel to rolling temperatures rapidly, with a significant reduction in scale produced. The quick heating permits a fast start from cold and a furnace capacity of 330 pounds per square foot of hearth area as compared to normal capacities of 50 to 75. Write for complete details.

* "Hi-Head" Furnace Patented.

R-S FURNACE CORP.

4555 GERMANTOWN AVENUE
PHILADELPHIA 44, PENNSYLVANIA

A SUBSIDIARY OF
HARDINGE COMPANY, INC.



RIGHT TOOL

in the right place
at the right time!



No. 5166-GS-3
*** Snap-on**

MECHANICS STANDARD SERVICE SET

● No time lost hunting *the right tool* when this carefully planned Snap-on set is at hand. No time-wasting "make-do" with sloppy misfit tools! Each of the 166 tools in the set is a basic in handling operations most frequently encountered in all types of maintenance work. In orderly arrangement in the big six-drawer chest, they are *safe*, and right at the finger tips when needed. Available through your nearby Snap-on factory branch. For free 104-page catalog of 4000 Snap-on hand and bench tools, write

SNAP-ON TOOLS CORPORATION

8132-K 28th Avenue, Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation.



New Books:

"Handbook of Industrial Safety Standards," ninth edition, was developed by the Accident Prevention Department of the Association of Casualty & Surety Companies, with the assistance of engineering specialists of the Association's member insurance companies. Handbook is a compilation of industrial safety requirements recommended by nationally recognized authorities. Topics include safety programs, accident investigation, materials handling, machine guarding, etc. Association of Casualty & Surety Companies, 60 John Street, New York 38, N. Y. \$1.40. 315 p.

"Statistical Theory of Extreme Values and Some Practical Applications," National Bureau of Standards, Applied Mathematics Series 33, by Emil J. Gumbel. Gives the statistical theory and techniques of extreme values. Outlines practical problems to which the theory pertains, introduces new statistical tools necessary for the theory, and shows practical applications. Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 40 cents. 51 p.

"Standards and Typical Specifications for Deaerators and Deaerating Heaters," third edition, Heat Exchange Institute. Defines terms and establishes standards of capacity, performance, and construction of deaerators and deaerating heaters. New table gives storage in minutes and cubic feet. Heat Exchange Institute, 122 E. 42nd St., New York 17. \$1.00. 11 p.

"Plastics Engineering Handbook," The Society of the Plastics Industry, Inc. This book covers design, materials, processes, equipment, finishing, assembly, testing and standards of plastics and plastics products. The methods for testing articles made from plastics are outlined. Contains a wide range of information on current processing, finishing and assembly techniques. Reinhold Publishing Corp., 430 Park Ave., New York 22. \$15.00. 813 p.

TECHNICAL BRIEFS

"Small Engines Service Manual," Implement & Tractor Publications. Repair manual for all popular makes of air-cooled engines. Gives specifications and step-by-step instructions for repair jobs. Implement & Tractor Publications, Inc., Graphic Arts Bldg., Kansas City 5, Mo. \$2.95. 74 p.

"One Hundred Years of Leadership," Stanley G. Flagg & Co., Inc. The story of the first hundred years of the Stanley G. Flagg Co. is reported. With the company's history many developments in the history of industry are told. Early advertisements and catalogs are reproduced. Stanley G. Flagg & Co., Inc., Philadelphia, Pa. 49 p. Copies may be obtained by written request on your company letterhead.

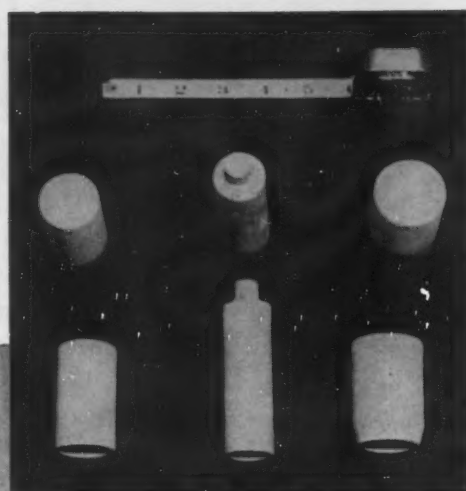
"Index to the Literature on Spectrochemical Analysis, Part III, 1946-1950," by Bourdon F. Scribner and William F. Meggers. This is the third part of a series of bibliographical surveys of the literature of spectrochemical analysis. References and abstracts are listed chronologically. A subject index is provided. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 226 p.

"ASTM Specifications for Steel Piping Materials," American Society for Testing Materials. Contains all the specifications for carbon-steel and alloy-steel pipe and tubing issued by the ASTM through the work of its committee on steel. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 360 p.

"Alternating-Current Machines," third edition, by A. F. Puchstein, T. C. Lloyd and A. G. Conrad. Shows how to understand, test, predict, and calculate the behavior and performance of the most important classes of alternating current power machinery. Includes information on loading polyphase transformers, adjustable speed drives, short-circuit characteristics of alternators, and rectifiers. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. \$8.50. 721 p.

Small

HIGH ALLOY CASTINGS

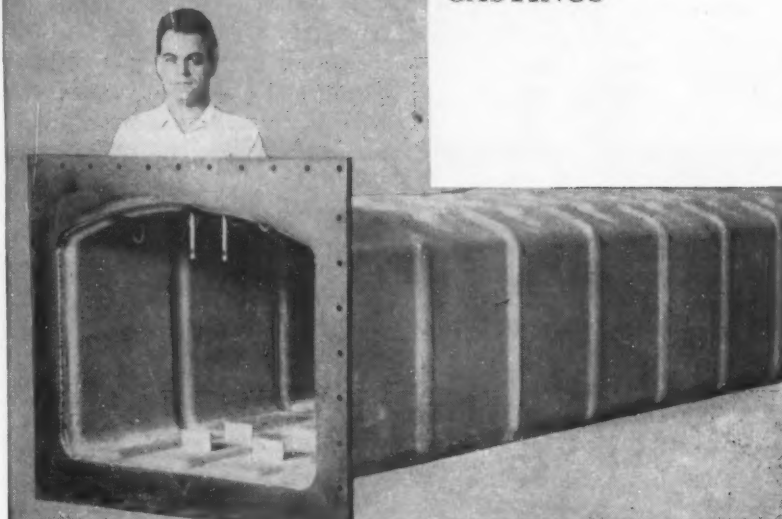


Carburizing Fixture for Ball Bearings $1\frac{1}{2}$ " diameter—Analysis 35% Ni — 15% Cr

DURALOY

Large

HIGH ALLOY CASTINGS



Muffle for Continuous Strip Annealing 12' 6" long — Analysis 38% Ni — 18% Cr.

LARGE or small DURALOY, can do it! These are just typical examples of the work moving through our foundry. Some of these castings are designed for heat resistance, some for corrosion resistance, some for abrasion resistance; all are cast by experienced foundrymen. All are carefully tested in our up-to-date laboratory.

If you have a high alloy casting problem . . . LARGE or small, we can help you. For more information, send for Bulletin No. 3150-G.

THE DURALOY COMPANY

Office and Plant: Scottsdale, Pa. • Eastern Office: 12 East 41st Street, New York 17, N.Y.

Detroit Office: 23906 Woodward Avenue • Pleasant Ridge, Mich.

Atlanta: J. M. TULL

Chicago: F. O. NELSON

Metal & Supply Co.

332 S. Michigan Avenue

METAL GOODS CORP. Dallas • Denver • Houston • Kansas City • New Orleans • St. Louis • Tulsa

NICKEL: Sintered Plates Extend Battery Life

High purity carbonyl nickel powder used in sintered battery plates plays a key part in making possible the long life of the new nickel cadmium battery . . . Plate porosity is about 80 pct.

Sintered plates made from carbonyl nickel powder, and having a porosity of 80 pct, hold the secret of the long-life nickel-cadmium battery. The batteries, made by Sonotone Corp. use sintered plates produced by Amplex Div. of Chrysler Corp.

The high purity of carbonyl nickel powder is much finer than normal metal powders, the particles measuring only 30 to 6 microns. Pure nickel wire screens, like fine mesh window screens help to hold the powdered nickel in place.

The sintered plates have up to 80

pct porosity, but the pores are so small they cannot be seen with the naked eye. The value of this feature is that the greater the porosity the greater the surface area that can be impregnated with the nickel and cadmium electrolytes, and thus the greater current capacity.

Plate Thickness Varies

After impregnation with nickel and cadmium active ingredients, the plates are made into batteries consisting of several cells depending upon the required voltage. One type of battery currently under manufacture consists of 15 plates

FOR MORE DATA ON MATERIALS

More information on any item reported in this section may be obtained by using the reply card on page 137. Indicate the page on which the item appears and note exactly the information wanted.

ranging in thickness from 0.026 to 0.085 in. The positive and negative plates are separated by protecting layers of plastic and fabric.

Great care is taken in the manufacture of the plates to keep them scrupulously clean. Workers must have clean hands, plant floors are vacuumed and even the packing material for the plates is virgin cardboard.

The battery will operate in temperatures as high as 165°F and as low as -65°F.

It has an extremely low self-discharge rate so that the battery will retain a working charge for as long as a year when standing idle. This battery is also very rugged and requires little or no attention and maintenance. The battery can be 50 pct charged in 15 minutes and completely charged in an hour.



WISCONSIN
HEAVY-DUTY
Air-Cooled
ENGINES

In 1953 a leading Design trade magazine conducted a survey among 1902 manufacturing plants on the use of Internal Combustion Engines of less than 60 hp., as power components in equipment made for resale.

Projected returns from 42.6% of plants contacted showed an estimated 678 plants using engines in the stated category, representing total engine purchases of 2,727,216.

Answering the question: "Who makes the Internal Combustion Engines you Use?" . . . Wisconsin Motor Corporation received 132 mentions, as against 105 for the second place builder, 56 for No. 3, 51 for No. 4—in a list of 41 classified engine manufacturers.

This outstanding preference for Wisconsin Heavy-Duty Air-Cooled Engines (although limited to a power range of 3 to 36 hp. in a broad survey classification including ALL engines below 60 hp.) provides tangible evidence that "WISCONSIN" rates first among men who know engines best. We'd like to count you among them.



WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN



Checking plate thickness . .
Turn Page

You can simplify purchasing . . . improve design . . . speed production

with improved C-D-F DILECTO[®] laminates

Only C-D-F, the Continental-Diamond Fibre Company, makes Dilecto laminated plastic, just as only Cadillac makes a Cadillac. Dilecto is 50 different materials with more combinations and variations in desired properties than we can tell you here.

But Dilecto has three important qualities that you should think about if you buy, design, or machine laminated plastics.

DILECTO HAS HIGH MECHANICAL STRENGTH

Mechanical strength is frequently an important determining factor in the selection of an insulating material. Insulating parts used in large electrical power equipment are frequently bulky. The high mechanical strength of Dilecto helps reduce size-dimensions of insulating parts without danger of failure. Instruments, meters and small motors frequently require very small insulating parts which must withstand comparatively large mechanical stresses. Insulation for use in high frequency circuits should have a minimum bulk factor for minimum dielectric losses. Dilecto fulfills these requirements with a combination of high mechanical strength and low loss factor, characteristic of the better C-D-F electrical grades.

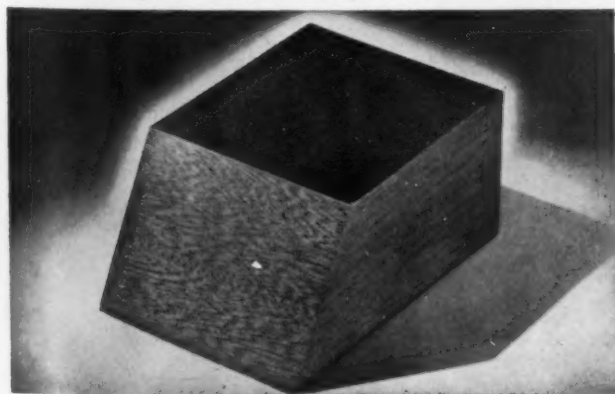
So C-D-F selects for your Dilecto insulation grade the correct, highest quality base material, paper, cotton, nylon, glass. These are used in combination with improved penetrating resins: Improved Phenolic, New Melamine, New Silicone, New Teflon, all synthetic, well polymerized resins.

Both the base and the resin are good insulators by themselves. But C-D-F sells them to you in an improved, practical form . . . Dilecto. Uniform sheets, tight tubes, strong rods, close tolerance machined and formed specialties, high bond strength metal clads.

Why does Dilecto combine so well mechanical strength with dielectric strength and dimensional stability? Because Dilecto is almost homogeneous, a true blend of resin and base.

DILECTO IS ALMOST HOMOGENEOUS

A poor laminate absorbs moisture at its edges, loses its insulating properties fast. Entrapped moisture and other volatiles within the cured structure causes inconsistent dielectric strength, with ultimate puncture and breakdown.



Punch press and bench saw operators know how much time and material is saved when the laminated plastic is *uniform* and *homogeneous* in nature like Dilecto.

DILECTO IS IMPROVED

Yes, C-D-F Dilecto is an improved laminated plastic, due to high standards and advances in resin and manufacturing techniques. It is watched by skilled workers in our modern plants, checked against rigid standards . . . C-D-F standards . . . by our quality control people. It is easy to machine, and the C-D-F shops are doing a booming business in specialties.

Table I—Typical Improved Phenolic Laminates

Commercial designation ^a	Resin	Filler	Improved properties	Improvement due to:
MEC-5	Phenolic	Nylon fabric	Insulation resistance; moisture resistance	Filler
XXHV-2 ^b	Phenolic	Paper	High dielectric strength parallel to laminations	Resin and manufacturing technique
CRD	Phenolic	Cotton mat	Better machining	Filler
XXXP-26 ^b	Phenolic	Paper	Insulation resistance; moisture resistance	Resin and manufacturing technique
C-92	Xylenol ^c	Cotton fabric	Alkali resistance	Resin
CF	Modified phenolic	Cotton fabric	Postforming	Resin

^a All grades are Continental-Diamond Fibre Company.

^b Resins have improved penetrating properties and the manufacturing techniques use these properties to provide better impregnation of the filler. Since thorough impregnation eliminates entrapped moisture and air, greater moisture resistance and better dielectric properties are attained. Manufacturing techniques also provide suitable temperature control during the curing stage to assure uniform quality and optimum property values in the finished laminate.

^c Xylenol is essentially a dimethyl phenol.

—from Electrical Manufacturing Article "Wider Design Opportunities with the NEW Phenolics", Part II.

The next time you think of laminated plastics, the name to remember is C-D-F Dilecto. The improved, high strength, uniform material that makes insulation buying and using more a science, less a puzzle. New grades, new applications, new savings are just part of the Dilecto success story. Look up the facts in Sweet's Design File, or write for catalog. Send us your blueprint for quotation . . . tell us your design dream . . . C-D-F wants to work with you.



Continental-Diamond Fibre

CONTINENTAL-DIAMOND FIBRE COMPANY
NEWARK 85, DELAWARE

Alloy:

**Light weight Cu, Ni, Al alloy
resists cavitation, erosion.**

A new copper, nickel, aluminum alloy is showing exceptional resistance to cavitation and erosion in marine uses. In one application, a propeller blade on the S.S. American Clipper after one years service still shows the buffing swirl marks from original fabrication.

Another vessel, the S.S. American Packer, equipped with the same type propeller, showed fuel saving per mile of 8.2 pct with its top speed 5.6 pct higher than the results obtained with an original four-blade manganese bronze propeller.

Redesign for Efficiency

The material Nialite, a development of Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., is a zinc

free alloy of copper, nickel, aluminum and other elements. Its light weight and high strength are other valuable properties which contributed to changes in propeller design for increased efficiency. For example, the Nialite propeller on the S.S. American Clipper was 20 pct lighter than a manganese bronze propeller for the same ship.

This lighter propeller means less bending stress in the tail shaft and a minimum of wear in the reduction-gear because it eliminates longitudinal shaft vibration. The higher strength permitted reducing the blade root thickness from 9 to 7 in. Thus, finer blade sections were obtained, and, as a result, the vessels are performing much more efficiently than with the original propellers.

Repair by Welding

Various cavitation and impingement tests on this alloy indicate a resistance to cavitation in the ratio of 4 to 1 to 6 to 1 over manganese bronze. Being zinc-free it also eliminates the problem of dezincification which frequently occurs with manganese bronze propellers.

Comparative tests made by the Naval Research Laboratory indicate a corrosion fatigue limit in salt water of 12,000 lb per sq in. for manganese bronze and 20,000 for Nialite. If a propeller of this material is damaged it can easily be repaired by welding or brazing.



"Differential is my kind of car"

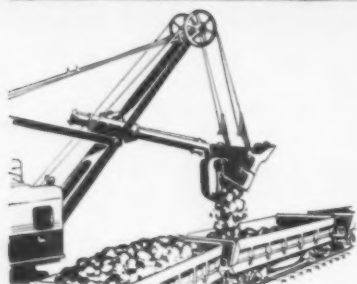
"I like the way they stand up under the punishment of that bruiser of a shovel. Unusually rugged construction does it. Somehow they seldom turn up for roll call at the shop. And out at the stockpile or dump they come clean. That 50° dumping angle is the answer. Dumping to either side is important, too."

This kind of talk from an increasing number of users is convincing. For nearly 40 years Differential Haulage Equipment has been doing a pace-setting job.

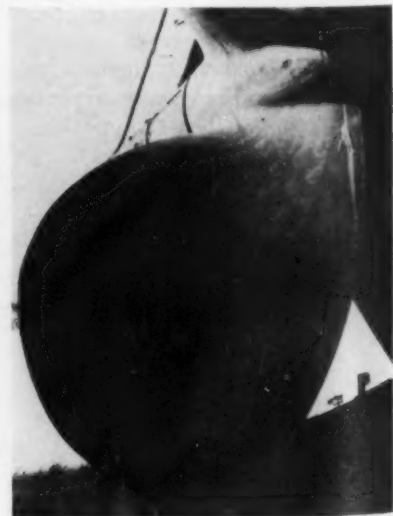
If you would like facts and figures to meet your needs, just write or call our Findlay office. You'll get prompt, expert help with your haulage problems, large or small.

DIFFERENTIAL PRODUCTS INCLUDE:

Air Dump Cars, Charging Box Cars, Ingot Mold Cars; Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.



SINCE 1915—PIONEERS
IN HAULAGE EQUIPMENT



Resists cavitation . . .

MATERIALS ROUNDUP

Plastics:

New plastic shows high resistance to heat.

A plastic for airplanes with excellent resistance to high temperatures was described recently at the 126th national meeting of the American Chemical Society in New York.

The new material can withstand a temperature of 500°F for 8 days, declared Dr. William Cummings, a chemist of the United States Rubber Co.'s Naugatuck Chemical Div., Naugatuck, Conn. The plastic is a laminate made with glass cloth and three different resins.

Applications for this new plastic in airplanes, ducts for hot gases, and high temperature molds and dies are foreseen.

Has Higher Strength

Tests of the resistance to bending showed the new plastic is up to 50 pct stronger than the next best plastic of this type. A resin mixture of maleic alkyd and TAC (triallyl cyanurate) produced a plastic that withstood a bending force of 19,000 psi after it had been heated at 500°F for 8 days.

The new laminate made from a mixture of these two resins plus DET (a diallyl bicycloheptene dicarboxylate), resisted a force of 30,200 psi under the same conditions.

Strength Compared

When only DET was added to the alkyd resin, the strength after heat treatment was 10,200 psi. This value was below that obtained with TAC, but with both DET and TAC a stronger plastic was obtained than with either one alone with the alkyd. The new material will cost less than the TAC plastic, it was reported.

The addition of DET to a resin mixture of TAC and alkyd resulted in a plastic less likely to get many fine cracks in its surface, he explained. This effect, known as "crazing" was least evident when a resin mixture of one part of TAC and one part of DET were added

THE MEDART COMPANY • 3535 DE KALB STREET • SAINT LOUIS 18, MO.

- When pre-set percentage of stretch is reached, machine automatically stops so stretching cylinder can be unloaded and grip jaws opened to release workpiece.
- Machine can be set from extreme length of 45 feet down to 10 feet in 30 seconds.
- To facilitate rapid setup for various lengths, output head is equipped with gear motor, and holding pins are extended or retracted automatically by an air cylinder that is push button operated.
- Both gripping heads are mounted on anti-friction roller bearings. Additional rollers on bottom of heads prevent "kickup."

WRITE FOR
COMPLETE DETAILS

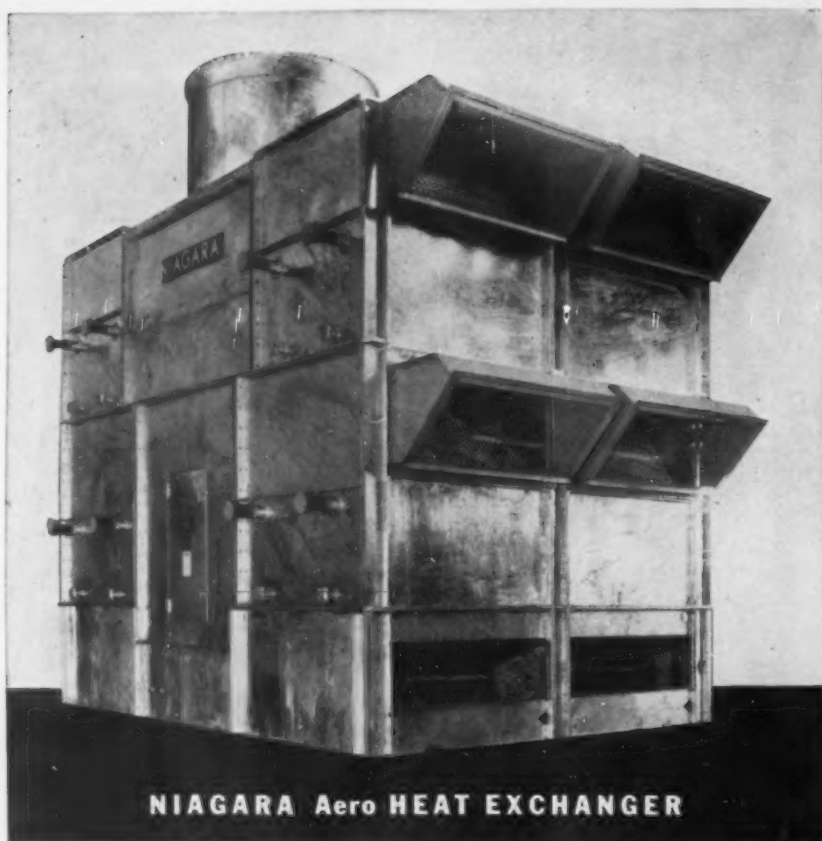


Model SL50-B/4-45

Push-Button Automatic Stretcher
Leveling With A 100,000-Pound Pull!

MEDART
STRETCHER LEVELER

- Push buttons control all clamping and stretching operations.
- Machine automatically travels at a high rate of take-up speed, then shifts automatically to low-speed stretching cycle. Three-speed stretching cylinder exerts a 50-ton pull continuously.



NIAGARA Aero HEAT EXCHANGER

Thirty Million B.T.U. CAPACITY with Precise Control of Temperature in Cooling

The NIAGARA Aero HEAT EXCHANGER cools liquids and gases by evaporative cooling with atmospheric air, removing the heat at the rate of input, controlling temperature precisely. You save 95% of cost of cooling water; you make great savings in pumping, piping, power; quickly recover your installation cost.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemical intermediates, coolants for mechanical, electrical and thermal processes. You obtain closed system cooling free from dirt. You solve all the problems of water availability, quality or temperature.

In CHEMICAL PROCESSES this is successfully used in cooling liquids and gases, chemical reactions, condensing distillations and reflux cooling.

Write for complete information; ask for Bulletins 120 and 124. Address Dept. IA.

NIAGARA BLOWER COMPANY

405 Lexington Ave.

New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

MATERIALS ROUNDUP

to two parts of the needed alkyd.

A smaller proportion of DET permitted more crazing with a corresponding loss of strength and greater amounts of DET introduced the low-strength characteristics of the DET alone.

Tin Alloys:

New Copper-manganese alloy to be shown at Metal Show.

A new white alloy—copper-manganese-tin—will be shown in samples flown here from England at the National Metal Exposition in Chicago, Nov. 1-5, as part of The Malayan Tin Bureau exhibit.

The new copper alloy, containing 15 pct manganese and 6 pct tin, was developed by the Tin Research Institute laboratory in England. The white, ternary alloy has good mechanical properties, can be readily cast, forged, rolled, stamped and otherwise processed. It is corrosion resistant, can be plated and has definite advantages over nickel-silver, particularly as nickel is scarce and manganese is fairly plentiful. Copper-manganese-tin, which can be produced at a competitive cost, is expected to have scores of industrial uses.

Other Alloys on Exhibit

Tin-nickel coatings, an alloy of 65 pct tin and 35 pct nickel, will be shown in tableware pieces and in an automotive part. This alloy is considered promising as a plating material for automobile trim, domestic appliances, electrical equipment and shop fittings.

Tin-zinc coatings, principally in combination of 78 pct tin and 22 pct zinc, will be displayed on radio components and washer parts. The alloy has a satin-white matte appearance, provides excellent corrosion protection, is easily soldered, even without flux, and costs about half as much as cadmium. It is being used increasingly by manufacturers as a standard coating on radio and TV chassis.

Aluminum-tin bearings made of the solid alloy and of thin sections of alloy backed by steel and Duralumin will be shown.

NEW EQUIPMENT

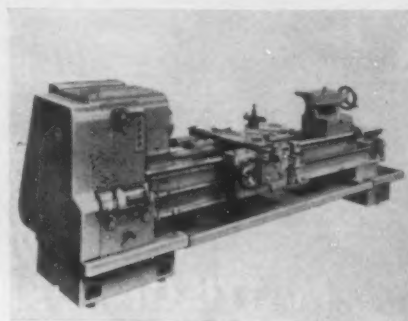
New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 137 or 138

Tray-Top lathes have 21½ and 26-in. swing

The new lathes have 12 spindle speeds in geometric progression, with a 3-lever, color-match, direct-reading shift mechanism. The spindle, with long taper key drive nose, is rigidly mounted in three precision anti-friction bearings. Fifty-four thread and feed changes are made available through a totally enclosed, automatically lubricated

quick change gear box. Apron is a one-piece, double-walled casting with automatic lubrication. Bedways are ground, and will be flame-hardened on demand. Lathes are offered with a 5 or 7½ hp motor mounted on the rear of the headstock or easy maintenance. *Cincinnati Lathe & Tool Co.*

For more data circle No. 29 on postcard, p. 137.

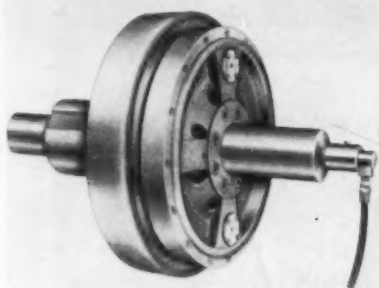


New air clutch provides finger-tip control

Quick action and ease of control feature the Dodge Air-Grip. It responds instantly to a touch of the throttle because a minimum of air is used in the operation of the clutch. This sensitivity provides finger-tip control and an ability either to inch the clutch or to throw it into full engagement, as required. Instant disengagement

of the clutch is achieved by quick release valves built into the clutch itself. Engineering advancements include provision for internal ventilation and for mechanical engagement of the clutch in case the air supply fails. Single, double plate models are 8.5 to 806 hp per 100 rpm, 80 psi. *Dodge Mfg. Corp.*

For more data circle No. 30 on postcard, p. 137.

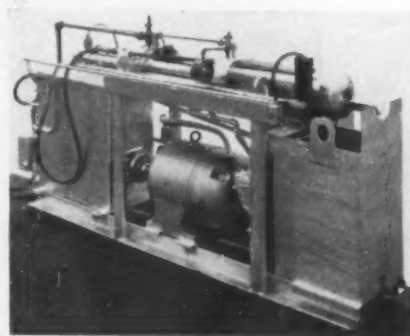


Descalers hot steel bars with pressurized water

The Hydra-Jet descaler uses pressurized water in removing scale from the surface of hot steel bars and billets which have been heated preparatory to forging or hot pressing. The pressurized water is free of air inclusions and is directed in a dense solid sheet edge to the hot metal surface. Because it is directed over a very small area there

is little descaling temperature drop in the hot metal and forging temperature can be more closely controlled. Less than 1 qt of water is required to descale 18 in. of a 3-in. bar. Manual and automatic controls establish cycle of operation and regulate speeds and stroke. *Commercial Shearing & Stamping Co.*

For more data circle No. 31 on postcard, p. 137.



Rectifier-type welder features quiet operation

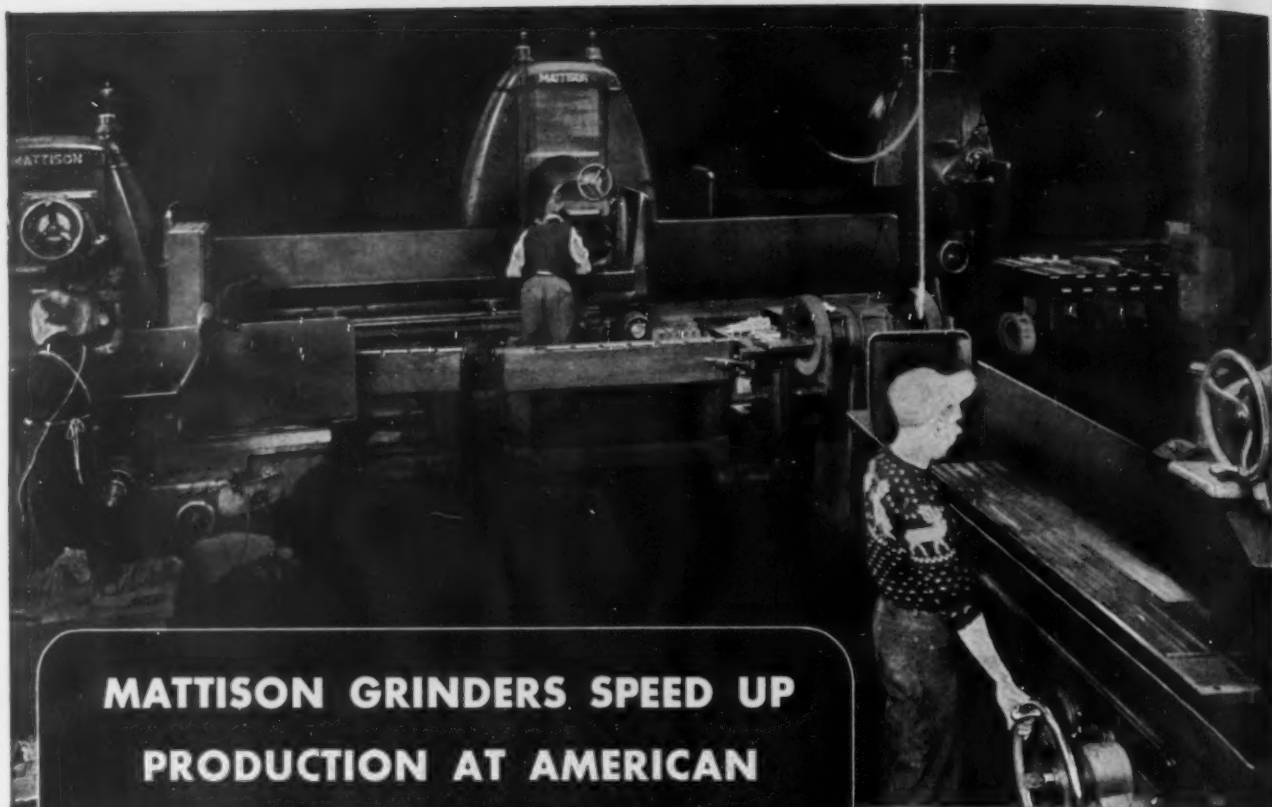
Low maintenance cost as well as quiet operation are features of a new 300-amp rectifier-type welder. The welder offers full time arc force control for holding very short arcs with deep penetration. The welder utilizes moving primary coil design, obtaining current adjustments by separation of primary and secondary coils. Stepless current control and highly accurate

amperage (20 to 375) settings are made possible by this design. The fully-automatic arc force control provides an extra surge of current to blast away short circuiting metal drops which would otherwise freeze a short arc and cause sticking. Coils and stacks are cooled by forced-draft. *General Electric Co.*

For more data circle No. 32 on postcard, p. 137.

Turn Page





**MATTISON GRINDERS SPEED UP
PRODUCTION AT AMERICAN
SAW & MFG. COMPANY**



● The four Mattison High Powered Precision Surface Grinders shown above are used by American Saw & Mfg. Company for the grinding of annealed tool steel strips and bars on a real production basis in the manufacture of Lenox Precision-Master Ground Flat Stock. Exacting manufacturing specifications demand excellent finishes within close limits of accuracy.

The massive double column support, high power and rigidity of construction of the Mattison Grinder combine with accuracy and speed of operation to insure consistent precision results on a high production basis for American Saw & Mfg. Company. For complete information regarding the capabilities of the Mattison High Powered Precision Surface Grinder send for free circular.

MATTISON

MACHINE WORKS

ROCKFORD · ILLINOIS

Mach
New co
venting
of ma
a mach
ly if
tected
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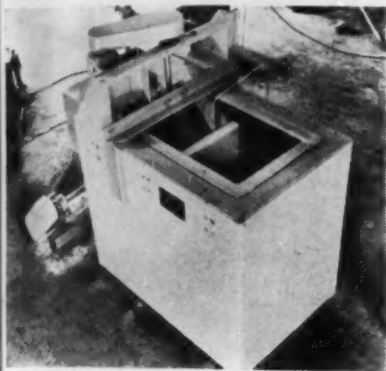
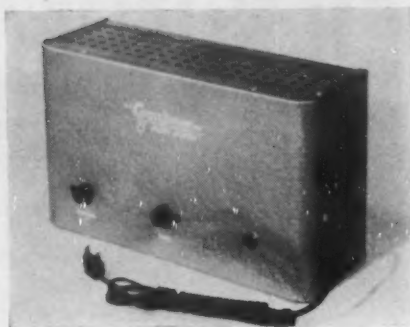
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Machine safety device prevents bodily harm

New compact safety device for preventing bodily harm to operators of machinery will stop or change a machine or operation immediately if a person moves into the protected area. The device is antenna equipped, the antenna being used to form the sensitivity pattern about operating machinery. The pattern may be set to safeguard a

limited area or a large area. Sensitivity of the antenna can be adjusted so that a body approaching to within 12 in. of the pick-up plate will actuate the Silent Sentry which in turn will stop a machine. If Silent Sentry should fail, machinery will stop until trouble is remedied. *R. G. Genzlinger, Inc.*

For more data circle No. 33 on postcard, p. 137.



Hot salt or oil quenching unit operates at 300 to 800°F

This gas fired hot salt or hot oil quenching unit is designed to operate in the range between 300° and 800°F, depending upon the selection of salt or oil. Container is heated by recirculating hot air around all the surfaces of the pot, including the bottom. By a temperature control arrangement, if the salt or oil rises above desired operating temperature, the gas is

shut off and cold air admixed to the circulating gases to reduce the salt or oil temperature. The gas comes back on when the salt or oil drops below desired temperature. Agitation of the hot salt or oil is provided by a propeller immersed in the pot. A filter will remove any high temperature salt carry-over. *Industrial Heating Equipment Co.*

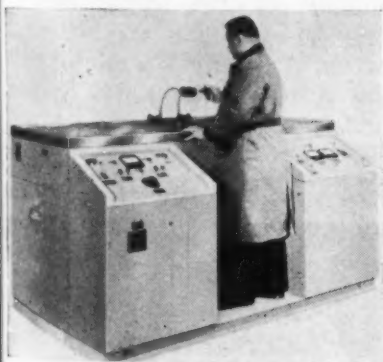
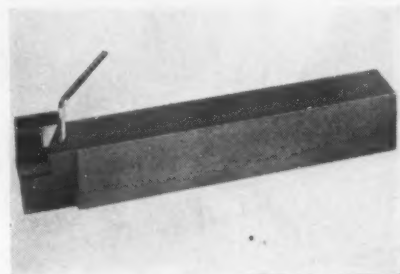
For more data circle No. 34 on postcard, p. 137.

Toolholder uses throw-away length carbide insert

The new Flash holder for throw-away blanks does away with all handling and grinding, reducing inventories and stock costs. Achieving full support from directly beneath by use of a cam locking device, the holder gives extended tool life. Its hardened high alloy shank

and parts resist washout and wear and the locking device self-adjusts to wear should it occur. A hardened anvil backs up the carbide in the cut. Chip control is gained by standard chip-breaker or blank for grinding. *Flash Carbide Tool Co.*

For more data circle No. 35 on postcard, p. 137.



Combined high frequency generator and work table

New 10 and 20 kw high frequency induction heating generators are designed for production line operation. The units combine both current generator and work table in a single cabinet. Salient design feature is the large and unobstructed 33 x 100 in. stainless steel work table which forms the top of the generator cabinet. It is backed by insulation to eliminate rever-

beration and heat transfer. Formed edges permit the table top to be used as a tray for quenching solutions. The operator stands or sits with the control panels at either side within easy reach. Control is manual or automatic. Panel lights give continuous indication of all the operating conditions. *Electric Arc, Inc.*

For more data circle No. 36 on postcard, p. 137.

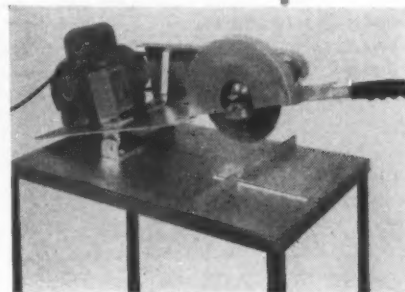
Cutoff machine will cut aluminum, steel, wood, plastic

By changing the cutting blade, this saw will cut steel, wood, aluminum, brass or plastic accurately and quickly. It will cut through 5-in. steel pipe or 7-in. aluminum extrusion. The machine features precision cast swivel mounting. A heavy welded steel belt and blade guard, easily removable, will accommodate

any size blade up to 10 in. Spindle shaft is mounted on sealed precision ball bearings. Fences provide for a straight or miter cut. Hand screw permits wheel adjustment. The Century can be easily moved. *Aluminum Enterprises, Inc.*

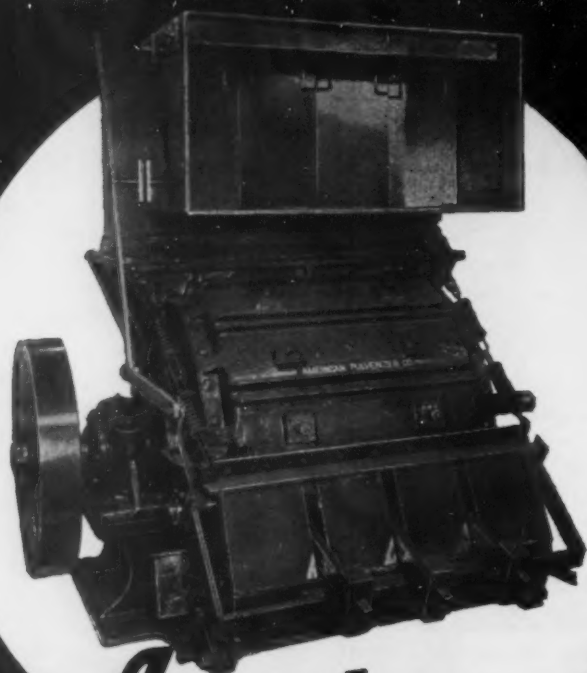
For more data circle No. 37 on postcard, p. 137.

Turn Page



CASH IN YOUR CHIPS

Change Metal Turnings Waste
into More Profitable Shoveling **CHIPS**



American
METAL TURNINGS

CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: \$4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year (20 tons/month at \$4 extra per ton)	\$ 960.00
6,000 Gallons Recovered Cutting Oil at 30¢/Gal. (50 gals. per ton x 240 tons = 12,000 gals. Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)	\$1,800.00
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.	\$ 300.00
TOTAL GROSS PROFIT	\$3,060.00

American
PULVERIZER COMPANY

WRITE for Metal Turnings Crusher Bulletin.

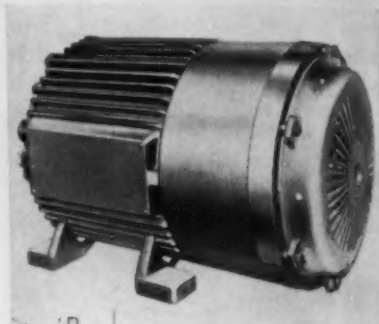
Cooperators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

NEW EQUIPMENT

Thrust brake motors

Built in a complete range of sizes from $\frac{3}{4}$ to 30 hp, both squirrel and slip ring, new motors feature a built-in brake. Axial thrust for braking action is provided by a coil spring. Counter-thrust, which takes place as the motor is ener-



gized, is accomplished as the result of the flux-aligning tendency of the grooved rotor and stator design. These motors are simple in construction and fully meet all NEMA standards. The rotating brake member also acts as an effective fan for air cooling of the motor. Brake release is exceptionally fast, and long brake lining life is claimed. *Harnischfeger Corp.*

For more data circle No. 38 on postcard, p. 137.

Cuts wire rope

With this abrasive cutoff wheel, wire rope of all sizes can be cut quickly and easily without deforming or unraveling the individual wires. The wheel is a 16 x 5/32 x 1 in., A24-V10BN resinoid Norflex. It features strength and safety, operates at 3425 rpm. *Norton Co.*

For more data circle No. 39 on postcard, p. 137.



Turn Page

YOUR FORGING PROBLEMS can be solved at NATIONAL FORGE



These cylinder blocks are used in high pressure pumps. Extreme service requirements and frequent replacement indicated to our metallurgists the need for a high alloy, basic-electric steel thoroughly heat-treated. By making the necessary changes, the blocks are now giving long life under severe service

usage . . . another example of our cooperation in solving a customer's problem.

The facilities at National Forge permit a large diversification of forgings for many applications. No matter what your need, there is an answer to your special problem. Send us your inquiries for your problem forgings.



NATIONAL FORGE AND ORDNANCE COMPANY

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IRVINE, WARREN COUNTY,
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Steel company reports that LATTICE BRAID* Flax Packings last 3 times longer than ordinary flax packings



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rod and shaft packings.

Dominion Iron & Steel Co. Ltd. of Sydney, Nova Scotia installed our LATTICE BRAID Flax packing on the hydraulic cylinders of their open hearth mills. Dominion's master mechanic stated that LATTICE BRAID lasted three to four times longer than any other flax packing his company had used. In addition, he said LATTICE BRAID does not score the ram. Now, Dominion is so well satisfied with this packing that they are ordering LATTICE BRAID Packings for other applications.

Put Garlock LATTICE BRAID Packing to work for your company. All the braided strands of this unique packing are lattice linked together into one structural unit. The strands hold together even when the packing is worn far beyond the limits of wear of ordinary braided packings.

LATTICE BRAID is made from flax, cotton, asbestos, wire-inserted asbestos, Teflon, and asbestos with Teflon impregnation—for various types of services.

Get all the facts about LATTICE BRAID Packings. Contact your Garlock representative or write for new folder AD-131.

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In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

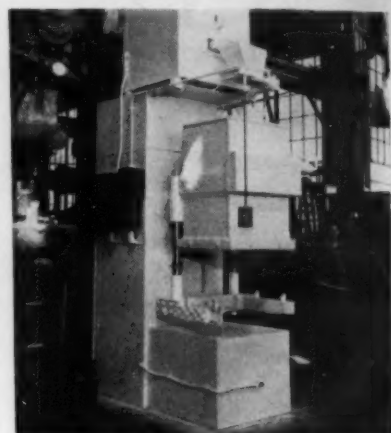
GARLOCK

LATTICE BRAID PACKING



Six shells each minute

Fully automatic complete-in-itself shell investment unit offers shell molders all the control features necessary for exacting production of shells up to 24x30 in. in size. It will form 6 perfect shells each minute, though actual production from the unit depends upon the shell curing capacity provided. The shell investor features precise investment time control, metered sand resin addition, controlled sand



resin rainfall, and thorough lump scavenging. It may be used individually with any curing and stripping equipment and then later combined in a complete rotary Formatic unit. *Beardsley & Piper, Div. Pettibone Mulliken Corp.*

For more data circle No. 40 on postcard, p. 137.

Magnetic skelp roll

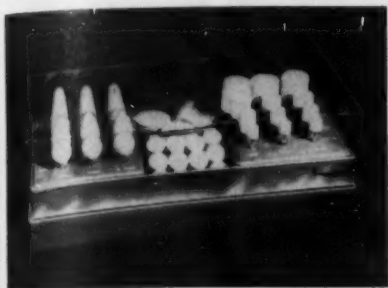
New permanent magnetic skelp roll is being used to replace electro rolls in propelling skelp into furnaces, boosting efficiency and cutting maintenance and downtime. The unit consists of a heavy steel shaft on which are keyed two strong cast aluminum hubs; attached to these is the magnetic element itself, composed of heavy Alnico V bar castings, which in turn is covered by the outer, cylindrical steel pole rings or shoes. Unaffected by heat up to 700°F, the initial roll can be installed two feet from the furnace. Because of greater magnetic strength, the units afford more positive control of the skelp. *Eriez Mfg. Co.*

For more data circle No. 41 on postcard, p. 137.

NEW EQUIPMENT

Felt bobs

An assortment of Paramount Brand felt bobs are packaged in a box that doubles as a handy bench-top holder for the bobs when they are not in use. Bobs are mounted

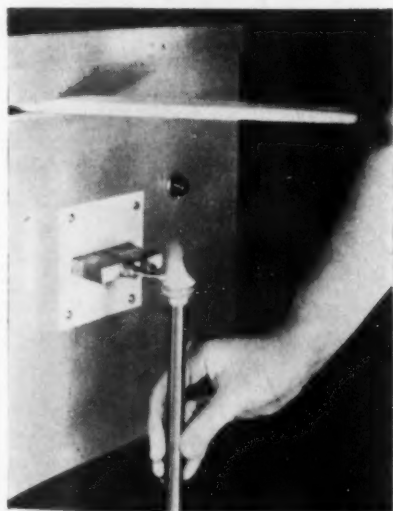


on $\frac{1}{8}$ in. mandrels and include 12 plain shapes in soft, medium hard and rock hard, 16 standard shapes in four degrees of hardness, 36 wheels, a mandrel, 6 squares of rubbing felt. *Bacon Felt Co.*

For more data circle No. 42 on postcard, p. 137.

Heats titanium rod

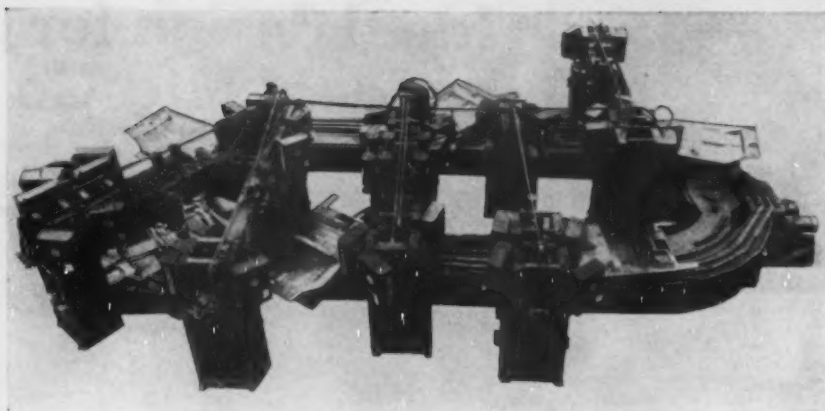
A high-speed induction heater, fast enough to heat a $\frac{3}{8}$ -in. rod of titanium to 3400°F in 9 sec, is available for general and special industrial heat treating applications. Induction heating can now be used



for butt welding titanium rods and for maintaining desired temperatures in the metal until machining operations are completed. Soldering, welding and annealing of other, more commonly used metals are accomplished by Model 10,000 heater in fractions of a second. *Radio Frequency Co.*

For more data circle No. 43 on postcard, p. 137.

Turn Page



Early example of Federal Resistance Welding Automation is this Floor Pan Welder for a leading automobile builder. Placed into operation in 1938 it featured continuously moving fixtures and walking guns. Produced 250 units per hour.

Why All This Talk About Automation?

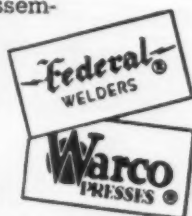
The automatic handling of work in process isn't a new idea. Leading manufacturers in almost every metal working field have been using "automated" machinery for years to increase the productivity of their work.

The talk about automation today, of course, is a result of the concentrated effort on the part of vast numbers of manufacturers, large and small, to stay competitive by trimming production costs whenever possible.

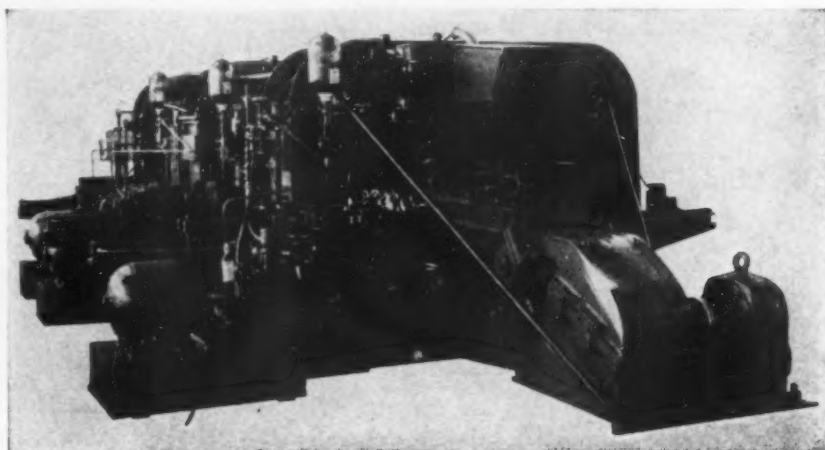
Federal, for almost a quarter century, has been working with such people in developing resistance welding machinery that would reduce costly, non-productive handling to a minimum.

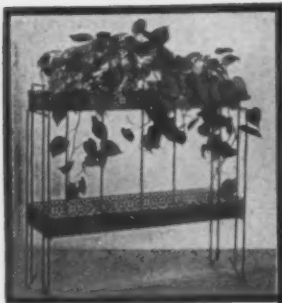
While automation may be new to many machine builders Federal design engineers have piled up 25 years experience in designing and building automatic handling and assembling equipment, dial, shuttle and transfer feeds for resistance welding. A big reason why you should take your welding problems to "Federal — First in Resistance Welding."

The Federal Machine and Welder Co., Warren, Ohio



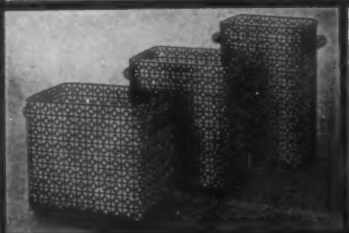
Modern Example of Resistance Welding Automation is this Federal Special Three-Station Transfer Type Muffler Assembly and Welding Machine. It produces 600 complete assemblies per hour. Reduced labor forces required by several hundred per cent.





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Ideal design for the Ideal Mfg. Co.



With today's trend toward modern styling, Hendrick is becoming more and more important to fabricators of metal products. Typical of these is the Ideal Mfg. Co. of Oskaloosa, Iowa, who manufactures the attractive home furnishing items shown above using Hendrick's Perforated Metal Square Link design.

And this is only one of hundreds of designs Hendrick can supply in commercially rolled metals and gauges with round, square, diamond, hexagonal or slotted perforations. If you would like further information, write Hendrick today.

Hendrick MANUFACTURING COMPANY



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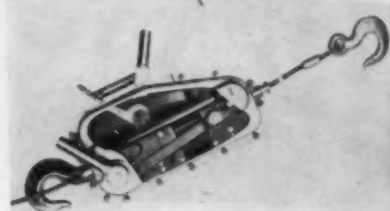
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tonnage
per
edge**

A

**A M E R I C A N
S H E A R K N I F E C O .
H O M E S T E A D • P E N N S Y L V A N I A**

Cable hoist

The Tirfor Griphoist is a manually operated, portable, hoisting or pulling device. Design combines a crank and cam mechanism. Wire rope, 1/2 in. diam, passes through the machine in a straight line and does not reel or spool inside the machine. Two pairs of steel jaws

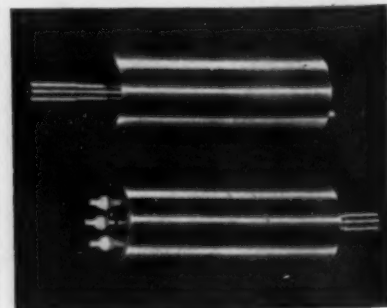


grip the cable. Each pair alternately grip and pull, then release and slide back for the next gripping and pulling cycle. A full load can be pulled at speeds to 10 ft of cable travel per minute, or movement can be precision controlled to 0.001 in. in either direction. The machine is rated at 3300 lb on a single line. *Griphoist, Inc.*

For more data circle No. 44 on postcard, p. 137.

Linear transducer

Linear motion, relative displacement, position and vibration can be measured with a new linear transducer designed for operation at elevated temperatures. The instrument may be used in ovens, in hot fluids if tubing cable conductor is used, in radioactive regions, or for other applications where the trans-



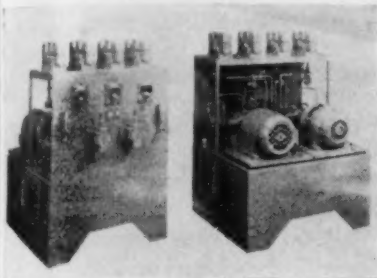
ducer must be mounted or operated in a region of elevated temperatures. Temperature range is between -160° and +1300°F; linear ranges from 1 to 32 in.; operating sensitivities to 5 v per in. Simple design and heavy construction prevent damage from shock or mistreatment. *Crescent Engineering & Research Co.*

For more data circle No. 45 on postcard, p. 137.

NEW EQUIPMENT

Hydraulic power unit

New hydraulic power unit built for a special machine that drills, taps and mills hydraulic steering housing includes powering a Dudco motor, which feeds and turns a tapping head. The unit feeds a milling head, clamps the part and

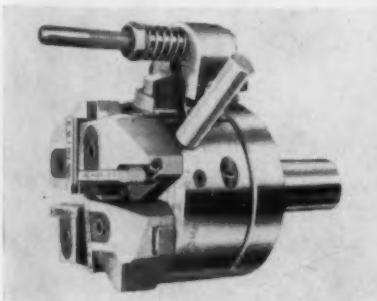


operates a positioning cylinder which in turn, relocates the part for the tapping, after the drilling operation. Equipment consists of Dudco PFB-5-100 pumps rated at 2000 psi; two 2-hp electric motors; dust tight solenoid valves; Double A compensated flow controls, pressure controls and check valves; 40-gal JIC reservoirs. *J. N. Fauver Co., Inc.*

For more data circle No. 46 on postcard, p. 137.

For B&S automatics

A 1/2-in. EXX Landmatic head for application to Nos. O, OG, 2 and 2G Brown & Sharpe automatic screw machines is compactly designed and features long life tangential chasers and a range cover-



age from No. 4 to 1/2 in. Unlimited thread length is available for workpieces under 3/8 in. diam; maximum of 1 13/16 in. thread length can be obtained on larger pieces. A floating shank with adjustable spring tension provides a means by which the lead of the feed cam may be compensated for in varying degrees. *Landis Machine Co.*

For more data circle No. 47 on postcard, p. 137.

Turn Page

ARMSTRONG *Carbide* TOOL HOLDERS



For
Higher
Speeds,
and Heavier
Feeds

ARMSTRONG Carbide Tool
Holders and ARMIDE (Carbide

Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.



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ARMSTRONG BROS. TOOL CO.

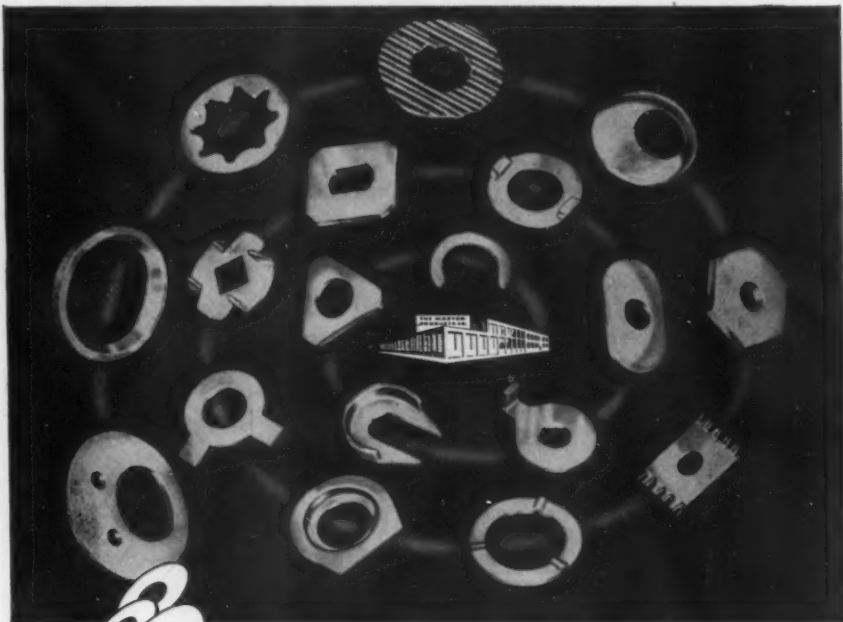
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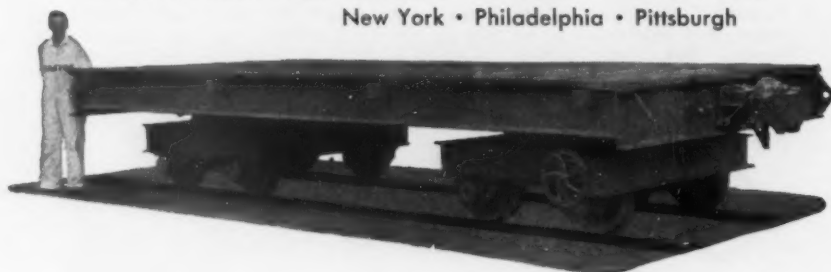


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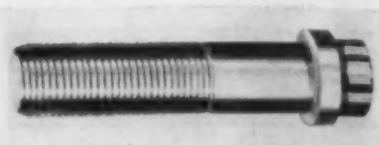
Sources for every need in the Metalworking industry.

Use reply postcard on Page 138 to request further information on products advertised in this issue.

The **IronAge**

External wrenching screw

New design in the fastener field employs wrenching of screws for flush fits in standard counterbored holes. The Countr-Bor screw fits any socket head screw application and according to the manufacturer,



offers greater economy and permits overall improvement in design. External wrenching, with the standard 12-point socket wrench and increased wrenching area result in greater wrenching torque. Requiring no special hexagon key, the Countr-Bor is easy to service. *Ferry Cap & Set Screw Co.*

For more data circle No. 45 on postcard, p. 137.

Quick setups

Toolflex neoprene mounted tool holders are available in 48 sizes with bores ranging from 3 in. down to 1/4 in. The tools are designed for very heavy duty applications such as large boring mills or small, close center, multiple



spindle setups. Toolflex tool holders are simple in construction, full floating and self-centering, due to heat and wear resistant neoprene float. This assures quick setups, minimizes scrap due to bell-mouthed and oversized holes; gives long, trouble-free operation. *Burg Tool Mfg. Co.*

For more data circle No. 49 on postcard, p. 137.

NEW EQUIPMENT

Paint heater

A paint heating system which utilizes hot water is designed for maximum efficiency in large or small painting operations. To simplify the system and make it foolproof, the unit has only one moving part, a pump for circulating hot water. Material to be sprayed is heated in a heat transfer unit located near the spray station. Exchange of heat from the hot water to the material is positive and speedy. Paint cannot become overheated.



Water for the system is heated in a separate unit which can be located wherever most convenient. One water heater will handle several heat exchangers. Each heat exchanger will heat up to 32 oz of material per minute. *DeVilbiss Co.*

For more data circle No. 50 on postcard, p. 137.

Contour roll lathe

New 36-in. contour roll lathe turns rolls on necks or live centers at speeds from 0.75 to 53.5 rpm. Roll capacities are 6 in. minimum diam, maximum 36 in., with 11½ ft maximum length. The machine provides roll lathe rigidity and finish with engine lathe speed and flexibility. Completely hydraulic tracer control insures smoother, more accurate finish. Tool post and carriage are designed to use singlepoint carbide-tipped tools or regular turning tools. Ways on carriage and tail stock are nonmetallic, extending service life. Timken roller bearings throughout; herringbone gearing; automatic lubrication. *Youngstown Foundry & Machine Co.*

For more data circle No. 51 on postcard, p. 137.

"KRANE KAR Exceeded Our Expectations,"

Says
R. E. BREITUNG, P.A.
GIDDINGS & LEWIS
MACHINE TOOL CO.
Fond du Lac, Wis.

Ask about
the New
Lease-a-KRANE KAR-Plan
... 1 to 3 Year Lease
with Option to
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Write for Bulletin No. 79B

"Silent Hoist" KRANE KAR Swing-Boom Mobile Crane... 1½, 2½, 5, 10, 12½ Ton Capacities

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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ALL THE WORLD comes to Cincinnati
for machine tools, pianos, radios,
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THE ALVEY-FERGUSON COMPANY 568 Disney St. Cincinnati 9, Ohio
OFFICES OR REPRESENTATIVES IN PRINCIPAL CITIES

November 4, 1954



What has an ack-ack shell fuze to do with your present problem? *Plenty...as you'll see*

You'll find this "flash channel" in time-and-point detonated shell fuzes that make our anti-aircraft guns deadly to enemy planes.

The channel is Superior tubing—lead-pencil size. Along it races the flash-through—from point detonator to main powder charge—that explodes the shell on impact. The same tubing serves as a pinion in the gear train of a mechanical detonator, which explodes the shell at a set altitude. Result: double deadliness for ack-ack.

What about your problems? Wait just a moment . . .

Trouble was that flash-through must travel a perfectly straight path to prevent misfires. Ordnance had the dickens' own time with this problem. Flash channels of drilled bar stock proved untrustworthy. And it wasn't until Ordnance called on Superior that the puzzle was licked. A special grade of heavy wall Superior tubing—precision drawn Type C1118 carbon steel—proved perfect for the multiple

close-tolerance machining needed to make the fuze part.

Now! You may need tubing made with the same accuracy essential in flash channels. And much of it may require special dimensions, shapes, even analyses. Superior makes a specialty of such special tubing. For example, you'll encounter Superior tubing in hypodermic needles, heat exchanger coils, truck wheel bushings, jet-engine ignition harness, and electronic parts of many kinds.

Superior will be happy to work with you in developing, designing and producing the tubing you need. If you have a problem involving tubing, get in touch with us. Write for a FREE copy of Superior's 40 page Carbon and Alloy Steel Catalog and more information on special tubing. Superior Tube Company, 2004 German-town Ave., Norristown, Pa.



Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

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All analyses .010" to 1/4" O.D.
Certain analyses in light walls up to 2 1/2" O.D.

The Iron Age SUMMARY . . .

Ingot rate pushes to 76.0 pct, a new high for the year . . . Scrap prices move up again . . . Cold-rolled sheets lead market recovery.

Buying Policy . . . A quick turnabout in steel buying patterns is rapidly changing the steel market outlook. A month ago steel buyers were generally taking it easy, living off the shelf. But now they are worrying about deliveries.

Many buyers are taking a fresh look at their inventories in view of higher manufacturing schedules and extended delivery promises. Frequently the answers they come up with are not at all reassuring.

Short-Sheeted . . . After lagging through the early part of the year while other steel products carried the ball, cold-rolled sheets are leading a strong fourth quarter advance. Greatest market strength is in the great Chicago-Detroit consuming axis, where revived automotive demand has been piled on top of demand from other more consistent consumers.

Sold Out . . . Result is that some Midwestern mills are sold out on cold-rolled sheets for the balance of 1954. Some are now accepting orders for rolling and delivery in the first quarter of 1955. And they are beginning to pick and choose their business with an eye toward costs and customer relationships.

Impact of the strong upturn is being felt as far away as the East Coast, where cold-rolled sheets can still be obtained with only a 6- to 7-week wait. But deliveries are becoming more extended in the East, too.

Some consumers will face a cold-rolled sheet shortage for the next 60 to 90 days. However, it is unlikely that the shortage will persist much longer than that because of the industry's expanded capacity. Still it's a hard fact that some consumers sliced inventories too deep and got caught in the changing market with their supplies down. They are now looking to warehouses for supplies or paying freight from more remote mills. Their problems are complicated by the fact that some big consumers who had been virtually out of the market are now making their presence felt in a big and forceful way.

Production . . . Steelmaking operations this week are scheduled at 76.0 pct of rated capacity, a gain of another point from last week. The steel ingot production index is estimated at 112.3 (1947-49 = 100). The market is not yet stabilized. It is expected to reach a peak sometime in November and the December decline will likely be shorter and milder than usual.

Steel Output, Operating Rates

Production	This Week†	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,804	1,776	1,692	2,096
Ingot Index				
(1947-49=100)	112.3	110.6	105.3	130.5
Operating Rates				
Chicago	79.0	78.5	73.5	98.5
Pittsburgh	74.0	73.0	69.0	92.0
Philadelphia	68.5	64.0	62.0	95.0
Valley	71.0	70.0*	64.0	92.0
West	82.5	82.0*	85.5	94.0
Detroit	97.0	97.0*	93.0	92.0
Buffalo	87.5	87.5	68.5	106.5
Cleveland	81.5	82.0*	72.5	94.0
Birmingham	64.5	71.0	74.0	96.5
S. Ohio River	87.0	85.0	82.0	78.5
Wheeling	88.0	86.0	93.0	101.0
St. Louis	91.0	84.0	75.5	89.0
East	45.5	46.0*	47.0	88.0
Aggregate	76.0	75.0	71.0	93.0

* Revised. † Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.798	4.798	4.798	4.634
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$34.00	\$33.33	\$32.00	\$35.33
Nonferrous				
Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	92.25	92.375	94.625	81.50
Zinc, E. St. Louis	11.50	11.50	11.50	10.00

Uptrend For Most Products

Galvanized, hot and cold-rolled sheets lead active market . . . Alloy and carbon bars continue to improve . . . Structurals, wire products are holding steady.

♦ **TWO REASONS** why today's steel market, while good, is not likely to reach "runaway" proportions: railroads and pipelines. The rails, large consumers of steel in many forms when they're "up," are virtually out of the market. Big pipeline projects, while in the works, are not expected to develop into steel business until early next year.

Nevertheless, most steel products are continuing to show improvement. Cold-rolled sheets are so good that some producers have been considering adopting a system of allocations, may already be shipping on that basis.

There's been a certain amount of "panic" buying in sheets following re-entry of automotive producers into the market. Some producers say this is not justified. They point out that while mills in certain areas are loaded up to year's end, sheet capacity as a whole is operating at 80-85 pct of capacity. Mills farther away from major consuming areas have not filled up so rapidly as producers closer to consumers.

Galvanized sheets continue strong. Alloy and carbon bars continue to show improvement. Structurals are holding steady. Plates are dull. Stainless has improved. Electrical steel, bolstered by the upswing in appliance sales, is in a healthy spot. Wire products are fair despite seasonal downturn in merchant wire.

SHEETS AND STRIP . . . Cold-rolled sheets running wild. Chicago reports delivery minimum is eight weeks and one mill is booked into first quarter. A prediction from Detroit: Sheets will continue tight through first quarter then run out of steam. Hot-rolled sheets and strip also gaining strength but nowhere

near that of cold-rolled. For one reason, the car makers are using less hot-rolled tonnage than formerly. In the East, cold-rolled sheets on 6-week delivery basis; hot-rolled, 2-3 weeks. **Cleveland, Pittsburgh sheet markets** also strong. Galvanized continues strong contrary to former seasonal experience, probably due to growth of continuous galvanizing into manufacturing markets as well as housing. Jones & Laughlin is getting back into galvanized sheet business, plans to build a continuous line in Pittsburgh, starting construction next year. Line will produce in gage range of 14 to 30 in. widths up to 48-in., will have capacity of 7000-8000 tons per month. J. & L. also is changing one of its alkaline electrolytic tinplate lines to the halogen process.

BARS . . . Bars are getting a little more color in their cheeks but still showing effects of a lean diet. Hot-rolled coming back better than cold-finished. But there's no question that both have improved. Appliance, automotive, and farm equipment are the chief contributors. Re-inforcing bars show no inclination to ease off. Jones & Laughlin has developed its hot extrusion plant to the break-in stage, probably will be unveiling it within the next two months.

PLATE AND STRUCTURALS . . . In the East, there's no sign of a structural seasonal letdown; tonnage

figures are up slightly over last month. In Chicago, light structurals are gathering even more steam but the heavier sections seem to have shot their bolt; fabricators are cutting prices, deliveries on 2-3 week basis. Immediate delivery is the rule on West Coast. Jones & Laughlin plans to install additional equipment to produce heavier joist sections on its 14-in. mill at Aliquippa; after completion mill will handle 14-in. section compared with present 12-in. beam; product's primary market will be light construction; new equipment will include heavier roll stands, facilities for rolling blanks off the bloomer, for shearing and straightening.

PIPE AND TUBING . . . Good on seamless and butt weld. Mechanical tubing improving. Jones & Laughlin is scheduling installation of additional facilities, including heat treating and handling equipment, to step up its ability to produce higher strength casing and tubing for the oil industry; also, J. & L. will be getting into electricweld pipe in big way for the first time with plans for installation of a Yoder type electricweld mill at Aliquippa; electricweld sizes will be 4½-in. to 12¾-in. OD in full range of wall thicknesses and lengths.

WIRE . . . Market is good. A letdown in merchant wire in some areas is more than offset by pickup in manufacturers wire. Industrial fasteners are doing a share of the pushing. In Chicago, even merchant wire is picking up again despite the season. But other centers are not so lucky on the merchant end of the business. Cleveland says wire deliveries are running between 2 and 7 weeks depending on what kind you're buying. In the East, merchant wire is off but manufacturers wire is up due partly to better buying by automotive spring makers. Jones & Laughlin plans to put in additional wire facilities at Aliquippa. Result will be some step-up in capacity, more manufacturers and high-carbon specialty wires, spring wire, rope wire, and so on.

WAREHOUSE . . . Business generally is good. But Cleveland has turned up one major distributor who finds a drop-off of about 6-7 pct in October from September, which was best month of the year; more extended mill deliveries will force more small consumers back to the warehouses. In Chicago, an October upturn is assured, extending through most products, including some bars and plate.

Purchasing Agent's Checklist

DEFENSE: Military agencies select wartime suppliers	p. 69
STEEL: Inventory cutting lowers '54 earnings	p. 72
CONSTRUCTION: Fabricators see 1954 a record year	p. 75
COPPER: Consumers get 25,000 additional tons	p. 174

Comparison of Prices

(Effective Nov. 2, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 2 1954	Oct. 26 1954	Oct. 5 1954	Nov. 3 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.82	5.82	5.82	5.675
Plate	4.225	4.225	4.225	4.10
Platem wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Revolving billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.798¢	4.798¢	4.798¢	4.634¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Nov. 2 1954	Oct. 26 1954	Oct. 5 1954	Nov. 3 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.19	\$61.19	\$61.19	\$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti.	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	\$56.50	\$56.50	\$56.50	\$56.50
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$35.50	\$34.50	\$32.50	\$37.50
No. 1 steel, Phila. area	33.00	32.00*	30.00	34.50
No. 1 steel, Chicago	33.50	33.50	33.50	34.00
No. 1 bundles, Detroit	26.50	26.50	27.50	29.25
Low phos., Youngstown	35.50	35.50	35.00	40.50
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	45.50
No. 1 mach'y cast, Philadel'n.	42.50	42.50	41.00	42.00
No. 1 mach'y cast, Chicago	43.50	43.50	42.50	38.00
* Corrected.				
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$34.00	\$33.33*	\$32.00	\$35.33
* Corrected.				
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.38	\$14.38	\$14.38	\$14.75
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.75‡
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	92.25†	92.375*	94.625	81.50
Zinc, East St. Louis	11.50	11.50	11.50	10.00
Lead, St. Louis	14.80	14.80	14.80	13.30
Aluminum, virgin ingot	22.20	22.20	22.20	21.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50
† Tentative. ‡ Average. * Revised.				

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on P. 180 →

Producing Point	Basic	Fdry.	Mall.	Basic	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo III	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	56.50	57.00	
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50		
Duquesne L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	56.50	57.00	
Erie I4	56.00	56.50	56.50	57.00	
Everett M6		61.00	61.50		
Fontana K1	62.00	62.50			
Genoa, Utah C7	56.00	56.50			
Granite City G2	57.90	58.40	58.90		
Hubbard V1			56.50		
Minnequa C6	58.00	59.00	59.00		
Monessen P6	56.00				
Narville I4 P4	56.00	56.50	56.50		
Pittsburgh U1	56.00			57.00	
Scranton S3	56.00	56.50	56.50	57.00	
So. Chicago R3	56.00		56.50		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swadlow A2	58.00	58.50	59.00	59.50	
Tulsa I4	56.00	56.50	56.50	57.00	
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	
N. Tonawanda T1		56.50	57.00		

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 5¢ per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 35¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, H1, \$68.25; Jackson, J1, G1 \$47.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 8.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferroalloy prices are \$1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingot, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.30
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25		27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75-63.00	50.50-50.75	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md., E1; Middletown, O., A7; Massillon, O., R3; Cary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, J4.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher) W1 (25¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, J4.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

Composite Hits New '54 High

New orders raise scrap composite price to \$34 . . . Highest point so far this year . . . Up 67¢ from last week . . . Steelmaking grades strengthen in East, Pittsburgh, Ohio.

◆ **NEW MILL** orders in Philadelphia and Chicago this week raised **THE IRON AGE** Heavy Melting Steel Scrap Composite Price to \$34, up 67¢ from last week and a new high for this year.

Steelmaking grades were firm in most areas, with other increases being registered in Youngstown and Buffalo. Anticipated declines in Chicago were averted by new buying, with the exception of No. 2 dealers' bundles, which slipped 50¢ at the bottom of the price spread.

Dealers and brokers were generally optimistic, seeing increased buying as a direct result of higher ingot rates. And with steelmakers predicting higher operations for the balance of the quarter, the scrap business was expected to hold at about current levels.

Turnings continued to look up, with several districts reporting price increases as mills stepped up buying to match higher blast furnace activity. Cast grades generally moved in good volume with most prices unchanged.

A dock strike in Philadelphia was unsettled at press time, but it was still too early to determine what effect if any it would have on export scrap market.

Pittsburgh . . . On the basis of a sale, No. 1 heavy melting steel moved up \$1 per ton this week to \$36, top. A mill on the perimeter of the district paid delivered prices ranging from \$36 to \$38 delivered for the top grade. Top price is equivalent to \$36 for consumers in the center of the district. The mill also paid \$34 delivered for No. 2 steel and \$30 for a relatively few No. 2 bundles. Total tonnage was not high. A local automotive bundles list was bid up to over \$37, f.o.b., for the approximately 7500 tons involved,

or over \$40 delivered to mill. Paradoxically, an independent consumer in the district reportedly is picking up odd lots of No. 2 steel at "bargain" prices.

Chicago . . . Scrap held on stubbornly despite a strong buffeting last week as offering prices moved down, then snapped back up again as the price line held. Offers on turnings, regarded as a weak grade last week, at \$17 and \$19 could not be filled, and new sales at the previous \$18-\$20 pegged the price. While No. 2 dealer bundles slipped slightly at the broker buying level, and there was some expectation that No. 2 heavy melting might slip by week's end, there was no movement below previous prices at press time. Foundry grades and electric furnace are showing little strength, and steel and blast furnace grades have failed locally to reflect advances in other areas despite an advancing operating rate. Rerollers moved up \$1 to \$56 and at the same time a scattering of other grades slipped slightly.

Philadelphia . . . Strength continued apparent in the local scrap market as new sales pushed up steelmaking grades another \$1 per ton. Machine shop turnings and short shovelings were also sold \$1 higher and other blast furnace grades are quoted higher in sympathy. A dock strike, which started last week, was still unsettled as we went to press, but it was still too early to predict whether it would have any effect on the scrap export market.

New York . . . Continued export and domestic sales are holding this market firm at last week's prices. Steelmaking grades continue to move well, and turnings demand is staying up.

Detroit . . . Pattern of bidding on November industrial lists indicates a somewhat softer tone to the market. First industrial bundles to be sold on

the lists went at about \$32, then dwindled to about \$30.50 for the last to close. Local mills apparently purchased the lion's share of the automotive scrap but have not yet clarified their position on dealer scrap. In spite of the comparatively low prices of No. 2 grades quoted in Detroit, little if any is moving out of the district and sales are negligible here.

Cleveland . . . Two major buyers in Valley market made substantial purchases last week boosting No. 1 heavy melting price up \$1 to \$36 at top of range. This sale brought Valley market nearer normal differential with Cleveland. Volume and price remain firm but threat of blast furnace use continues to act as price damper. Industrial lists closed at about \$1 per ton higher and volume was up as high as 40 pct due to higher automotive production. Low phos 2 ft and under was incorrectly listed last week. Price should have been \$31-\$33.

Birmingham . . . The scrap market continues active at previously established prices but dealers seemed reluctant to sell because of expected mill buying next week at possibly higher prices.

St. Louis . . . The steel operating rate jumped to 91.1 pct, the highest it has been since Nov. 28, 1953, and the mills are disposed to continue stepping up their operations.

Cincinnati . . . Prices went up \$2 per ton on top grades based on purchase by area consumers. Only major weakness is in No. 2 bundles and railroad scrap, little of the latter being available.

Buffalo . . . Brokers bidding for material to cover old sales boosted steel items \$1 per ton. Mill buying at higher prices was expected also before the week ends. Blast furnace grades advanced 50c to \$1 a ton with machine shop turnings showing sudden strength.

Boston . . . Tone of the New England scrap market has eased slightly in the past week as a result of a dip in buying from Pittsburgh. Export business continues to support the trade and, all things considered, business is not bad.

West Coast . . . Talk of a price rise in San Francisco is gaining volume but there has been no change yet. Trade sources say "the price situation is extremely volatile—anything could happen."